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SOME PRINCIPLES OF MENTAL EDUCATION*

The fundamental psychological principles that I am about to explain will appear in various lights. Some person will complain of their abstractness, difficulty, and obscurity. Others will assert that the principles may be all very true and very important, but that they are quite unpractical. And finally some will exclaim, "Why, that's nothing new! Everybody knows this already." I am happy to say that I shall agree with everybody. I shall present, explain, and illustrate these principles in a general and fundamental way, leaving educators in their work to make the practical applications of them. Indeed, practical teachers can give a hundred examples of their applications where I could think of only one.

Again, because these principles are stated as principles, *i. e.* as fundamental rules, they must be unpractical. It is only when the rule is applied that we have something practical. The principles of percentage in arithmetic are not practical until actual use is made of them. Finally, all these principles are as old as the mind of man. I am not trying to create a new mental faculty, to add on another lobe to the brain, I am merely trying to state in clear and concise language certain principles which we all follow more or less. But by such a definite statement I hope that we shall get clear notions of what we are trying to do and shall be able to carry out our practical work with a full knowledge of the ends and means.

* Address delivered at the Educational Congress in San Francisco, May 18, 1894.

I. PRINCIPLE OF REGULARITY

Suppose I wish to determine how reliable a person is in judging the difference between two weights. I use two weights exactly alike and one a little heavier, but all exactly the same in appearance. I let him lift one of the weights as a standard and then one of the others. He tells me whether they were alike or different. Suppose I keep account only of the cases where both weights were really alike, the use of the slightly different weight being only to save me from telling an untruth when I say to him that sometimes the weights are alike, sometimes different. The results will show that in a certain per cent. of the number of trials he will declare that the weights are different although they are always alike. A person who has a larger per cent. of correct answers is more regular and reliable in his judgment than one with a smaller per cent. In general we can say that a person's regularity increases with his per cent. of correct judgments and, what is the same thing, decreases with his per cent. of mistakes. We can thus propose the law; the regularity is directly proportional to the per cent. of correct judgments. If the degree of regularity be denoted by R then

$$R = \frac{r}{n}$$

where r is the number of correct judgments out of the total n. When all the judgments are correct, $r = n$ and $R = \frac{n}{n} = 1.00 = 100$ per cent., or perfect regularity.

An exactly similar case is seen in the associations of the addition, subtraction, multiplication, and division tables. A child has to do a problem involving repeated additions. Wrong associations, *e. g.* $7 + 4 = 10$, produce errors in the results. Although some of the errors unite in the same final error, yet in general we can say that the per cent. of mistakes in the result is proportional to the number of wrong associations.

Likewise in a dictation exercise the per cent. of mistakes for each 100 words will indicate the irregularity at each stage of

writing. This introduces, as you see, quite a different system of marking which for the same exercise can be made universal.

When an act is repeatedly performed or a stimulus repeatedly perceived, the results vary in quantity provided the means of measuring them be sufficiently accurate. A convenient example is given by measurements on the time of rhythmic action. I will take the case of the leader of an orchestra who must beat time with his baton. It does not make much difference just how fast he beats, provided he beats regularly. To measure the regularity in a case of this kind I have arranged an electric contact on the end of a baton, by which a spark record

The Electric Baton.*

is made on a vibrating time-line drawn on the smoked paper of a revolving drum. I will not go into the details of the arrangement; it is sufficient to say that each beat leaves a record and that the time between each record can be measured in hundredths or thousandths of a sec. as desired. Suppose I have a record of eleven beats measured to hundredths of a sec. with the following results: 41, 42, 37, 41, 39, 40, 40, 40, 41, 38, 41. The average time of a beat is just 40. How regular is the beating? This is determined by finding the difference

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between each separate beat and the average, and taking the average of these differences. Thus,

41	1
42	2
37	3
41	1
39	1
40	0
40	0
40	0
41	1
38	2
41	1
11 | 440	11 | 12
40	1.1

The average of the variations (taken without regard to sign) is called the mean variation; it is here 1.1. In general language, for any number of results the average is

$$a = \frac{a_1 + a_2 + \ldots\ldots\ldots + a_n}{n}$$

where a_1, a_2, ... , a_n are the separate results and n the number of results.

If we take the difference between each result and the average we get $v_1 = a_1 - a$, $v_2 = a_2 - a$, ... , $v_n = a_n - a$ and the mean variation will be

$$MV = \frac{v_1 + v_2 + \ldots\ldots + v_n}{n}$$

where no attention is paid to the signs x or — of the original differences.*

Now let us take another orchestra leader whose record gives 40, 41, 42, 40, 39, 37, 35, 40, 41, 41, 38; which is the better man? The average is 40 as before, but the mean variation is 1.8 as compared with 1.1.

*A slightly better formula for MV is

$$MV = \frac{v_1 + v_2 + \ldots\ldots + v_n}{\sqrt{n(n-1)}}$$

but the additional labor of explanation and computation render it impracticable here.

Suppose we have a third leader from whom we get the 10 records: 40, 39, 40, 40, 39, 38, 39, 39, 39, 39. The average is 39.2, and the mean variation is less than 0.5.

It is evident that the second leader beats so irregularly that an orchestra cannot possibly keep time, that the first leader is somewhat better, and that the third is far superior to the others. The actual average time of a beat makes no difference within such small limits, as music played at the rate of 1 beat in 0.40 sec. is not sensibly different from that played at 1 beat in 0.39 sec. An essential qualification, however, for the success of an orchestra leader is his regularity in estimating intervals of time, and this can be determined by getting his mean variation.

Another example similar to the one just mentioned is that of a piano player who must learn to strike the notes at regular intervals. The quarter notes should all be about the same length; equal measures should be completed in equal times. For most beginners the mean variation in the time given to successive measures varies to such an extent that it is painful to hear them attempt a tune. By practice with the metronome successful players are able to reduce their *MV* till it does not disturb the playing. It is not known just how far this may be carried, as no one has ever taken the trouble to make accurate measurements. I will suggest, however, that even when the *MV* is so small that no one distinctly notices the irregularity, yet the actual irregularity present may be great enough to injure the effect. A successful musician of any kind should know not only that his instrument is in time but also that he himself is in tune.

I will take another example of irregularity from the subject of force: voluntary movement. A forge-worker must strike his piece of iron with just the force needed. The variations of several blows from their average will indicate his regularity. If he cannot control his hammer so as to strike regularly, his *MV* will be large and he will be a poor workman. A far more delicate matter is the force of the blow with the fingers in

piano playing, or the pressure of the bow on the violin string. Tones that should be of the same intensity must not vary too much from their average.

It will be noticed that I have given two different kinds of examples; the first were simply statistical percentages of right and wrong, the second involved measurements. There is, however, a way of reducing the the latter to the same basis as the first. The probability of getting a thing always exactly right I will indicate by 1 = 100 per cent. The per cent. of correct judgments obtained I take the liberty of calling the person's coefficient of regularity. In simple qualitative statistics this would be the person's actual per cent. of correct judgments, or $R = \frac{r}{n}$. In measurements where we have calculated the MV, we will assume as the coefficient of regularity the the expression $\frac{1}{MV}$, where MV is expressed as a fraction of the quantity measured. Thus, for the first orchestra leader the MV is $\frac{11}{400}$ of the quantity measured and his coefficient of regularity will be $\frac{1}{\frac{11}{400}} = \frac{400}{11} = \cdot 36\frac{4}{11}$. For the second it will be $\frac{400}{18} = 22\frac{2}{9}$; and for the hird, $\frac{392}{5} = 78\frac{2}{5}$.

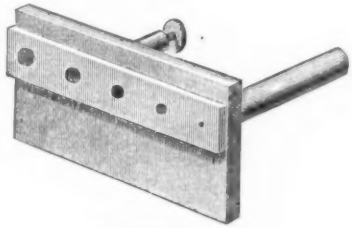
I think now that I have said enough to make clear the following statement of this principle:

Regularity in the perception of stimuli, the association of mental processes, and the execution of volitions shall be increased by education to the maximum extent consistent with the principle of economy. The measure of regularity is the percentage of correct results out of a possible 100 per cent. or is the reciprocal of the mean variation expressed as a fraction of the averag .

If more examples were needed, I could furnish many from our every-day experiences. A person who walks regularly makes his steps apparently even in length, time, and power. Since nothing is ever exactly right, there will be a MV in length, a

MV in time, and a *MV*, in power, all of which we can measure. That such a person's walk is apparently even is due to the fact that these *MV's* are too small for us to notice. To reduce a large *MV* in one who does not walk correctly, we must apply special training to correct the particular fault.

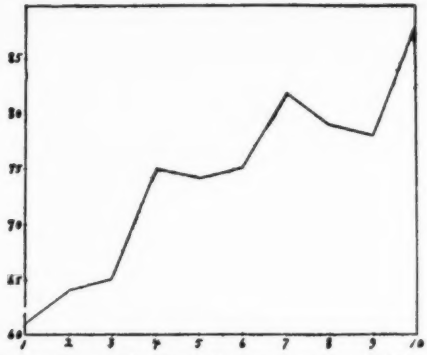
Another example can be found in the steadiness of the hand. No one can hold the hand absolutely steady; it trembles in one direction or another. If the *MV* of the distance of its trembling is small, the hand is normal. If the trembling is great, as in nervous, choreatic, or intemperate persons, the *MV* is very great. The quickest way to measure the trembling of the hand is to attempt to insert a fine point on the end of a stick into a small hole without touching the sides. The per cent.



Steadiness-guage.

of successful trials gives the coefficient of regularity. You may be tempted to say that the regularity of movements is a matter beyond the power of education. I happen, however, to be able to give (for the first time) some definite facts on the subject. One of the young ladies in my laboratory has been making experiments on just this point. Her results show that the control over the steadiness of her hand develops regularly with practice. Moreover, practice of the right hand develops the left although she does not practise that hand. The education seems to be an education of attention.*

* Studies from the Yale Psychological Laboratory, 1894. II, 114.



Increase of $\frac{r}{n}$ while educating the arm in steadiness.

II. PRINCIPLE OF ACCURACY

Suppose you are trying to draw a straight line 2 inches long. You try it a number of times and average up your results. You will find that they will not average exactly 2 inches but more or less. The amount by which your average differs from the actual 2 inches will be the constant error. For example, suppose the results of 10 trials to be 2.09, 2.10, 2.17, 2.15, 2.16, 2.17, 2.19, 2.09, 2.16, 2.12. The average is 2.14, which means a constant error of 0.14 inch. for 2 in. or 7 per cent. This you see is quite independent of the coefficient of regularity. The mean variation of the results from the average is 0.032 in. or 1.6 per cent.; the coefficient of regularity is thus $\frac{1}{0.016} = 62\frac{1}{2}$.

Another person may be much more or much less irregular, but may have the same constant error; or he may have quite a different constant error and may be the same or different in regularity. The two are quite independent. I will take another set of results, say, 1.99, 2.04, 1.90, 2.02, 1.94, 2.00, 1.91, 2.03, 1.95, 1.92. The average is 1.97, or a negative constant error of 0.03 in. or 1.5 per cent. The mean variation is 0.046 in. or 2.4 per cent.; the coefficient of regularity is $41\frac{2}{3}$. This individual is thus more accurate but less regular. To make an exact comparison, the constant error of the second is $\frac{1.5}{7.0}$ or $\frac{3}{14}$ as large as

that of the first. Since the larger the error the less the accuracy, we say that the comparative accuracy of the second is $\frac{1}{5}$, of that of the first, or nearly 5 times. This turning of a fraction bottom up is called taking its reciprocal. In general the *coefficient of accuracy* is the reciprocal of the constant error. Thus if a person's constant error is 7 per cent. or $\frac{7}{100}$ his coefficient of accuracy is $\frac{100}{7}$ or $14\frac{2}{7}$. If A denote the coefficient of accuracy and CE the constant error, then $A = \frac{1}{CE}$

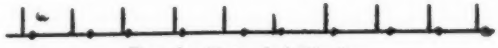
The principle of accuracy can be thus stated :

Accuracy in the perception of stimuli, in the association of mental processes and in the execution of volitions is to be cultivated to as great a degree as is consistent with the principle of economy. The measure of accuracy is the reciprocal of the constant error expressed as a fraction of the true result.

Let me now give you a few practical examples in which both the MV and the CE are of importance. Suppose you have a line of boys marking time. Let us attach to each a foot-key

Foot Key.

that makes a record for each step, and compare these records with the actual strokes on the piano. Some of them will give records like this :



Regular Retarded Rhythm.

The vertical strokes denote the emphasized notes on the

piano; the dots indicate when the foot is brought down. These boys will be very regular but will have a constant error. They are always behind time. Others will have records like this:

Irregular Accurate Rhythm.

These boys will be quite irregular but will on the average be "on time". Others may have records of this kind:

Regular Accurate Rhythm.

These will be very regular and accurate. Finally there will be some who are both irregular and inaccurate. These may give records like this:

Irregular Retarded Rhythm.

They are on an average ahead of time and are very irregular in being behind time. These records are not purely imaginary; similar records have been obtained in experiments carried on in my laboratory.*

A player in an orchestra or a band must not be ahead of or behind the others. He must not be irregular. He must, however, have a constant error in being just as far behind baton of the leader as the others are.

Many investigations have been made on regularity and accuracy in psychological processes.

One of the great fields of investigation is what is called measurement by the eye, or the judgment of different distances. One problem would be to take a line and put two dots upon it, setting off a certain distance, and then putting on another dot half way between the two. A man makes a certain error every time. The mean variation and the constant error are characteristic of the person, or characteristics of his condition. If he

**Thinking, Feeling, Doing*, Chap. xix, Flood & Vincent, Meadville, Penn.

is fatigued, he will have a much larger mean variation than he otherwise would. In manual training, and all questions where we have to judge distances by the eye, or make eye-measurements, special training is necessary. In some institutions models are placed in certain positions and are to be judged entirely by the eye, in order to gain the proper accuracy in this respect. When a student begins, his mean variation is very large, but it finally gets down very low. The ability to locate distances is of great benefit in the trades. Every free-hand artist, decorator, sign painter, tinsmith, even the bricklayer, depends for success on his regularity and accuracy of eye. I will even venture the statement that there is not a profession, trade, occupation, or even many complicated acts of ordinary life that do not depend on measurement by the eye. A surgeon with a large mean variation will be liable to cut an artery that ought not to be touched; a seamstress will make uneven stitches. You can readily see why manual training (which is largely eye-training) should have a prominent place in schools and colleges.

III. PRINCIPLE OF RAPIDITY

Time is money. Rapid thought and quick action sometimes make all the difference between success and failure. Every thought we think, every act we perform, takes time. A man who can think and act in one-half the time that another man can, will get ahead. If we could think twice as fast as we do, we should live twice as long, although we should live only the same number of years. Country people think more slowly than city people; the uneducated more slowly than the educated. In general the Americans are very rapid thinkers.

To-day the mental processes of the mass of the people go at a much more rapid rate than they did a few centuries ago. The mind has been educated by our whole civilization to act more rapidly. The difference between the sluggish Englishman of mediæval times and the

quick Yankee of to-day is delightfully told in Mark Twain's "King Arthur." If it were possible to take a man of two centuries ago and bring him into the laboratory, the results obtained from experiments upon him would be entirely different from those obtained from one of the students of to-day. The reactions of the student would be much more rapid, especially the complicated ones.

A great object in the education of children is to reduce their reaction times. When the country boy first comes into the schoolroom everything he does takes him a very much longer time than when he has been there for a while, especially any complicated act. Arithmetic for example, is simply a matter of the association of a set of ideas. We give so much time to do an example. When that time is over the pencil must be put down the slate dropped. The child who is slow is at great disadvantage. Education in arithmetic, especially mental arithmetic, has for one of its objects the reducing of the reaction time in associating ideas; say one-half of the instruction goes toward producing a firm memory of the associations and the other half toward making them more rapid.

The principle of rapidity can be stated in this way: *Rapidity of perception, rapidity of association, and rapidity of execution are to be developed as far as consistent with the principle of economy. The relative measures of rapidity are as the reciprocals of the time required.* Thus, if three persons had reaction-times of 25, 33, and 40 hundedths of a second, their measures of rapidity stand in the relation 4, 3, and $2\frac{1}{2}$.

Let me illustrate the principle by a few examples which may be made the basis of regular exercises.

A person should be trained to rapid movements. The arm should be trained to move quickly as in boxing or in fencing. Other things being equal, the quickest man "gets there." The draughtsman who works for so much an hour knows the importance of rapid drawing. The type-writer, the type-setter, and the mechanic must do as much as possible in a given time. Children should be trained to move all their limbs quickly.

Special attention should be paid to the arm movements which are trained in drawing, writing, putting things in place, as in sorting colors or grains of corn as rapidly as possible, etc. Other simple exercises might be added, e. g., the number of dots or the number of lines that can be made in a quarter of a minute.

One of the most important abilities to be devoloped is the rapidity of mental grasp or rapid sweep of attention. We all know the story of how Robert Houdin and his son educated this faculty. They would walk rapidly by a shop window, casting a single glance at it. Halting at the next corner they would try to recall all they had seen. At first they could mention only half a dozen objects, but the number rapidly increased till the son could note at a single glance everything in the window. The marvellous feats the son was afterward able to perform are told in Robert Houdin's memoirs. The important point is that they were wholly the result of careful, laborious education in rapidity of perception.

Innumerable exercises for this purpose can be carried on in direct assistance to the regular work of the schoolroom. The spelling of words can be learned by quick glances; the outline and parts of a country can be taught in greater and greater detail by successive quick exercises ; a problem in mental arithemetic is to be grasped with only a momentary presentation of it ; an object is to be drawn from an instantaneous glimpse, etc., etc. I have no space to go into details here, but I can say that there is not a single school exercise that cannot be so taught as to train this ability. In fact the children are naturally quicker than we suppose them to be, and I will venture the statement that lessons of interest to the child are nearly always presented in such a way as actually to teach him to be slow instead of quick.

Children should be trained in rapid association. Naming an object is an example of association of a set of motor impulses to a percept. See how many objects around the room can be named by a child in 20 seconds. Try this once a day for a

month ; you will be astounded at the progress made and still more astounded at the delight the child takes in developing one of his most important abilities. Write the name of something on the board ; see how many names of objects in some way connected with this can be written on the slate in one minute. Have you an uninteresting lesson to teach, e. g. the cities of the United States ? Put your questions in this way, with a watch in your hand : "John, I am going to ask you a question on the cities of the United States and you must give as much as possible in 10 seconds from the moment I say the last word. Ready !—principal cities in the State of- -New York."

Arithmetic is almost entirely a matter of association of ideas. The present lifeless and stunting methods of teaching it should be replaced by methods aiming at rapidity and accuracy.

Here, too, almost every exercise at present used in the schools could be so taught as to contribute to education on this principle and that, too, at a saving, not an increase, of time and labor. The only new thing required is a thorough knowledge of the principles of the new psychology on the part of the teacher.

Rapid distinctions and judgments form a large part of our mental activities. They can be cultivated in a thousand and one ways : in rapidity of sorting color-tablets, in arranging them according to likeness, in telling differences of form by touch and sight, etc., etc.

These three principles consist of two parts ; an old and a new. The older part is the popular notion that we must learn to be regular, to be accurate, and to be quick ; the newer part is the development of definite ideas of each of these concepts and the application of accurate methods.

Perhaps I have disappointed you in one respect. You may have expected me to tell you about the best methods of teaching geography, spelling, etc. But I do not believe in "teaching geography," "teaching spelling," etc. ; I do not believe in teaching any subject to children under twelve. Below that

age the children should be *developed*, should be *educated*, according to the methods best suited to their powers. You must develop their abilities in the very best ways, by the very best methods, regardless of how many facts you pound into them. If, during such development you can use means that also teach facts, so much the better. By geographical lessons you can develop their quickness of perception, their rapidity of thought and action, their accuracy of discrimination, their persistence, memory, etc., within the same time and with the same facts as you now use in what is called "teaching geography." The means are the same ; the difference lies in the object in view,—intellectual and volitional development versus memory-cram. The difference in purpose means a difference in methods and a difference in results. In one way you develop the mental ability of the child and at the same time provide him with the requisite store of facts ; in the other you may achieve the memory of the facts, but at the cost of deforming and stunting the child's mind.

I hope that these principles, so briefly stated, may not seem too revolutionary or too unpractical, but I wished to give a glimpse of a new pedagogy, not Herbartianism or anti-Herbartianism, not the system of any one person, but a new pedagogy as founded on the new (or experimental) psychology. The new psychology determines by careful observation and experiment the laws of mental life ; incidentally we do a little of what educators ought to do, namely, by actual experiment and observation we sometimes make an effort to determine the best methods of developing each ability. The old psychology was the psychology of guess-work ; the new psychology is founded on carefully obtained facts. It is sincerely to be hoped that a new pedagogy will rapidly develop on the basis of the accurately determined methods and carefully established principles of experimental psychology. The anatomical rooms and the physiological laboratory are the foundations of the science and art of medicine ; the physical laboratory is the foundation of civil and electrical engineering ; before long I

hope to see the psychological laboratory and the psychological clinic at the foundation of all education.

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APPERCEPTION

The relation of the world of mind to the world of matter has long been, and still is, a subject for discussion. The theory that essence from material objects passes through the nerves of the special senses, enters the soul, and in some way forms an image upon it, has about disappeared. At present, the tendency of belief seems to be towards an inner principle, or activity, which reacts upon external activity. Every reflecting being is no doubt conscious of this inner activity, though no one is very clear as to its nature.

The reaction of inner against outer activity, may be regarded as a kind of resistance, and consequently as an expression of force generated by physical excitation.

A result of the reaction mentioned is the formation of a product in the soul, which is supposed, at some stage of its existence, to convey to the intelligence some information concerning the nature of the external world. In popular language this product is called an image, or picture of an object which is in the external world. Whether the exact nature of the external world is thus revealed to the intelligence, however, has not been, and perhaps cannot be, determined. So far as we can judge, the internal response in no way resembles anything in the so-called external world. At best, the intelligence, in consequence of a consciousness of a set of internal sensations, can only assume the existence of a set of external manifestations. The internal activity must be aroused before the assumption can be made.

The individual who has no sensation of light can assume nothing regarding the color of an object. The consciousness of the former is an indication of the possible existence of the

latter. Thus it may be shown that our apprehension of the nature of the external world is but relative. It varies from day to day in the same individual ; and who shall say whether the apprehension of yesterday or that of to-day is the true one ? Furthermore, no two individuals apprehend the same object in exactly the same way, any more than they attach the same meanings to a word. The differences in the apprehension of different people, in regard to the same object are due to the differences in the psychical reactions, as well as to the differences in the physical excitations.

The earlier psychical experiences influence the later ones, and as the earlier experiences of individuals differ from one another, so do their later apprehensions of the world around them differ from one another.

Who can say which one among these various apprehensions is the most correct ?

Also, past apprehensions of phenomena determine the present apprehension of the same phenomena. In so far as the individual is aided by his past experience, his present view is modified, *i. e.* extended or corrected. Also, an opinion entertained in the past may be extended or corrected by a new experience.

A totally new apprehension is generally due to a rearrangement of old psychical products by means of which rearrangement new thought is generated. This new thought is employed in an extended apprehenson of external phenomena. In this as in other cases, the latest apprehension is determined by previous views of the same subject.

This theory is supported by numberless sayings which have passed into proverbs, *e. g.*, "We see with all that we have seen," "We only learn what we know," "One finds in Rome only that which one takes there."

Every attempt of one individual to communicate with another is an illustration of the same theory. A speaker seeking to convey his thought to a hearer begins by calling into the consciousness of the latter some past experience or thought similar

to that which he is about to present. The purpose is to secure the conditions for the understanding of the new thought which is to be presented. The process by which the new or the unknown experience is thus taken possession of, and translated into the terms of the old, or the known, experience is called apperception.

The more formal definition which is generally given, merely indicates the acts by which the understanding of the unknown is generally effected, *e. g.*, The process by which one concept or set of concepts is appropriated by another concept or set of concepts is called apperception.

We may observe that the definition provides not only for the apprehension of the new psychical product through the old, but for the apprehension of the unknown [whether old or new] through the known. It thus provides for a further apperception, or apprehension of that which has been already apperceived, and implies the possibility of the intelligence going beyond the limits of the recognition of the concrete, and of rising to an apprehension of the abstract, and even to an understanding of an abstraction of an abstraction, thus rendering possible the realization of pure thought into which the concrete may not enter.

Here a question arises regarding the relation of apperception to sense-perception. To some the two processes appear to be opposed. In reality sense-perception is a preparation for apperception. Sense-perception is the process by which sensations are combined into a larger product—*i. e.* the concrete or particular concept, or idea,—while apperception is the process by which this product becomes combined with a reproduced product similar to itself.

Sense-perception implies a more primitive condition of psychic activity than apperception, but it is in no way less important or less necessary than the latter. Without sense-perception, there would be no apperception, as there would be no apperceiving concepts, and no concepts to be apperceived. As a matter of fact, there is a point where sense-perception can

hardly be distinguished from apperception. Sense-perception is sometimes described as the process by which a sensation is referred to its cause in the external world. This implies an act of recognition which is the first stage of understanding, and hence belongs to apperception.

In this connection, we may mention the relation of observation to apperception. Generally observation is regarded as the work of the organs of special sense. We frequently hear teachers talk of cultivating the senses through observation. It is doubtful whether any organ of the body is in itself more capable of cultivation than is any other machine. Use, within certain limits, may make the machine more supple, *i. e.*, it may adjust the parts to one another in such a way that resistance is lessened, and time thus saved, but the machine is not otherwise improved. Use or exercise cannot do more than this for any of the organs of sense.

As the mental activity gains in power through connected thinking, however, it becomes more and more capable of directing the attention, and so uses its tools, the senses, with more and more skill, thus gaining more through them in a given time than the crude, uncultured mind can do. The eye of an eagle is probably a better organ than the eye of a man. Also the eagle probably exercises its eye quite as much as a man does, yet the observing power of the eagle is very much lower than that of a man.

In itself, observation is the work of the intelligence, and depends for its effectiveness upon the apperceptive capability of the individual. The more a man understands the more he is capable of observing in the line in which he understands. The astronomer sees in the heavens phenomena which are not revealed to the eye of one who is ignorant of astronomy. In a single glance at a plant, the botanist sees more than the man who is ignorant of botany would see in a day's study. One can not be said either to see or to hear that which one does not understand.

Practically, observation is apperception, and training in power to observe can only mean training in power to understand. Those who have dealt with children and young people know well that they hear only that which they really understand. They only collect and hold sounds in mind to the extent that they apperceive them. In regard to seeing, facts are similar. Much that meets the eye of the individual who is mentally untrained passes before it without making the slightest impression, simply because the person can not bring his mind to bear upon it.

To talk of training the senses or the body except as the mind is trained, and thus made capable of directing the former, is useless. Manual and physical instruction have mental development in view quite as much as have instruction in literature and history.

The work of sense-perception is to secure through the agency of the external world, the material which may be apperceived by reproduced concepts, and which having been apperceived becomes apperceiving material for new products. The process here indicated is known as the lower or outer apperception.

By reflection the mass of apperceived concepts is reproduced, and rearranged in such a way as will make possible a new apperception of that which has been apperceived already. By this means an increased understanding of the old material is secured. This old or known material is related to many groups of concepts with which it did not come into contact in the first apperception. Through new and extended apperceptions, new views of concrete phenomena are secured, and new psychical products are formed which have no counterpart in the external world. The perception of abstract truth arises first from a consciousness of the relations existing between concrete phenomena. These abstract concepts are apperceived by abstract concepts similar to themselves. Out of the combinations here implied other and higher abstractions are evolved. The process employed under this and similar conditions is known as outer or higher apperception.

Lower and higher apperception may be regarded as covering all psychical acts of which understanding is the result,—from the first psychical reaction against sense-perception which involves recognition, through all acts of interpretation and even of creation. This last includes the forming of the general notion by combining the characteristics common to all the members of a class of individuals or particulars.

In the light of lower apperception we may again refer to the expression "training the observation." The exercise of the observation is generally regarded as the work of sense-perception; but inasmuch as the work of observing is a work of recognizing, observing is really a process of apperceiving, and has value only to the extent that the intelligence or the understanding is trained. This is evidenced by the fact that a very young child or an individual of feeble intelligence cannot be made to observe carefully and continuously. If apperception be not taking place at the time of observing, the physical senses can be exercised with but little effect. Apperception insures psychical activity, and implies the retention of a product in consciousness long enough for recognition to take place.

Apperception renders the senses susceptible to the thousands of excitations which are constantly overlooked by persons of limited experience and limited intelligence. We perceive with the intelligence rather than with the eye and the ear.

While the lower apperception is an absolutely essential foundation for the higher, in itself it is a primitive process. It secures little, if anything, beyond the recognition and interpretation of new concrete products. It deals with concrete particulars rather than with concrete generals.

Abundant examples of lower apperception are to be found in the similes and metaphors in minor poetry, and in the lesser literary works of the day, when one concrete concept is translated into terms of another concrete concept. The writer who calls "dew drops" "diamonds"—the "moon" a "silver boat,"

—the "stars" "lamps of heaven,"—the poet who "heard the trailing garments of the night sweep through her marble halls," may make graceful interpretations, but on this ground at least can not lay claim to the creative power of the artist.

The power to rise from the apprehension of concrete phenomena to the apprehension of abstract general truth implies the exercise of the higher apperception, while the power to make that truth apparent to the intelligence of another implies the creative power of the artist in the true sense of the word.

Examples of the exercise of the higher apperception are to be found in such writings as the Don Quixote of Cervantes, Shakespeare's Julius Caesar, etc. Similar examples may be found in other departments of art, *e. g.* in architecture, sculpture, painting, music, the drama, etc.

In addition to the higher apperceptive power as shown in the fine arts—so-called—the same may be observed in theories of invention and discovery, which theories are perhaps more truly creations than the former. Theories of invention and discovery require quite as much knowledge of law, and quite as accurate judgment as do theories of art production.

We may mention here that the apprehension of abstract general notions is only reached by the human intellect by a passage through concrete particulars.

The importance of a thorough knowledge of apperception on the part of the teacher can hardly be overestimated. The principle of apperception, viz. : the relation of similarity, is that upon which the possibility of instruction depends, Every teacher who has succeeded in opening a line of communication between himself and his pupil has recognized the necessity for basing new information upon that which the child already possesses, while he has found invariably that previous experience furnishes a basis for understanding, which in its turn arouses attention and renews effort.

The direct result of the blending of similar concepts is the generation of pleasant feeling which underlies involuntary attention and immediate interest.

One who has observed the pleasure of a child in hearing the same story repeated, and his displeasure and even grief at changes or omissions, will readily understand the pleasure that arises from apperception. Probably in every case unpleasant feeling is due to failure to apperceive, *i. e.*, failure to understand.

The power to apperceive abstract truth marks the superiority of man over the brute. The brute is dependent upon the world around it and upon the present. The past is of little if any service to it beyond that it aids in the recognition of objects. The human being is free to rearrange his past experiences, and to evolve from them new forms of thought by means of which he is able to select from new psychical products that which will be of service to him, and to reject that which is calculated to be a hindrance. Thus he becomes master of the world to the extent that he can apperceive it, and so becomes more and more independent of it. Through the power of apperception, he tames the forces of nature and makes them do his will.

The continuous work of comparing and blending similar concepts, implied in apperception imparts steadiness and strength to the mental life. Through it the whole mass of past experiences is made ready for use at a moment's notice. The individual who possesses a well-arranged, logically connected stock of experiences is never a prey to the chances of circumstances. He is able to meet the unexpected, and to make it his. If, however, the mass of past experiences be not well-arranged and classified upon the basis of similarity, later apperceptions must be necessarily crude and incomplete. Probably no amount of care in later life can make up for lack of careful apperception in the early life of the child. Failing this care in the early life, fine and close discriminations on the part of the adult are well nigh impossible. The defect is indicated in crude and hasty judgments, together with inappropriate, inefficient, and inadequate action, which must of necessity be sub-

jected to constant change and correction without any material improvement.

The most aggravated cases of such failure may be observed in persons who are incapable of sustained effort in any direction.

The effect of apperception upon the character must not be overlooked. Habitual, thorough apperception of experiences, together with careful reflection upon the same,—during which reflection higher apperception must take place,—insures clear insight, steadfast, reliable judgment, and effective. well-timed action.

Some one has said that all the mistakes in the world arise from insufficient observation. Perhaps we may say more correctly that all the mistakes in the world arise from insufficient or incomplete apperception.

The man who apperceives is the man who delays judgment until he can relate his new experiences to the mass of known products that are similar to the new. Having brought the new product into its right relations with the whole, he is able to pronounce upon it correctly and with authority.

The power to relate correctly, and to judge accurately, imparts stability to the character, and secures that organic firmness, suppleness, subtlety, adaptability, and individuality, which we call culture. Such culture secures its possessor against awkwardness, or embarrassment, and enables him to meet all emergencies with tranquilty and repose.

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PSYCHOLOGY AND PEDAGOGY

If the relationship of psychology and pedagogy is not a burning question, it is at least a phosphorescent question. We meet it everywhere. The department of pedagogy in universities has courses in psychology, the instructor at Teachers' Institutes has his lecture on psychology, and the educational journals, even those for public school teachers, have

their psychological corners. Books and booklets, treating of these alliterated ologies, pour from the press; and grave philosophers predict that the application of the science of the mind is going to work a revolution in pedagogy.

Yet there are, after all, a few teachers who hold themselves sceptical towards the new movement. Some have read no psychology at all and have done well without it; others have tried to read elaborate texts on the subject, but have failed to understand them; others again have read and understood, but have been unable to find the point of application. "What is pedagogical psychology?" said the inquirer to the sceptic. "pedagogical psychology," replied the sceptic, "is a text book of psychology and a text book of pedagogy bound together." Certain it is, that a treatise like "Sully's Outlines of Psychology" lends some color to the reply of the sceptic, for at the end of every chapter, on psychological questions, there are a few pages of pedagogy; the substance of which is the same as the contents of a text, devoted exclusively to the practical side of education.

If, now, we seek the motif, the original impulses of the sciencing of pedagogy, we shall find that there are two: 1. The scientific spirit of our age. Science has done so much for our material welfare by its electricity and bessemer steel; it has done so much for our intellectual welfare by its exploitations of the heavens above and the earth beneath; it has done so much for our spiritual welfare by its rout of the spirits of darkness and of dread, of superstition and sciolism, that it has completely infatuated us, and we follow it blindly and regardlessly. The exactness of the mathematical aw of relative proportions in chemistry and of falling bodies in physics we would introduce into art, into literature, into morals, and into education.

2. The confusion of "common observation" with science. Every science has its beginnings in common observation, and in its developed stages carries along with its body of recondite principles a large pendant of facts of common observation. Ig-

nited wood burns when air is supplied. Saliva dissolves the starchy elements of food. These are chemical facts of common observation. Water runs up an exhausted tube. Heat expands metal. These are physical facts of common observation. Exercise develops the muscles. The point of distinct vision is about ten inches from the eye. These are physiological facts of common observation. A man has two arms, a fish two fins, a bird two wings. These are anatomical facts of common observation. "No two minds are alike,"—which an eminent advocate of psychology in education gravely tells us we learn from psychology,—attention facilitates learning. These are psychological facts of common observation. Now if we examine closely, the pedagogical psychology of the day, we shall find that most of it is built upon the facts of common observation rather than upon the abstruse principles of psychology.

Pursuing the method of exclusion, and eliminating from psychology all the subjects that are conceded to have no bearing upon pedagogy, we shall find that we have only the thinnest and the scrawniest science left. Take perception, for instance, and of the multitude of questions treated thereunder, it is save to assume that none of them have any direct bearing upon pedagogy. True it is that without perception there cannot be knowledge and without a modicum of time, there cannot be distinct perception, but these again are facts self-evident to every one who understands the terms. Consider the localization of sensation: how it is that a prick of a pin when transferred to the sensorium and there changed into a spiritual entity, a fact of consciousness without place, direction, length, breadth, or thickness, should be given a local habitation on the finger, and thus assigned a definite space relation. Take the whole question of space; how our space concept is built up, how we estimate distance, how we determine the direction of a sounding or luminous body, how we project the sensation of light or sound to its objective origin, feet, yards, miles, distant from us.

Take the distinction between sensations and perception and Weber's Law of the discrimination of sensations; all of these subjects are treated elaborately in psychology, and yet, none of them can be made of practical application in teaching. The teacher, then, who goes to psychology for direct assistance in his specialty, shall find, after his exhaustive study of perception, that he is a wiser psychologist, but a no more sagacious teacher. But perception does not exhaust the list of subjects that fail to grip the question of teaching. The freedom of the will, the reality or phenominality of the internal world, dreams, sonambulism, hallucination, thought transference, hypnotism, and the localization of the brain functions, all of these subjects are important and of singular interest, but their orbit is as separate and distinct from the orbit of teaching as it is from the orbit of the signs of the zodiac.

Other important psychological topics are: the order of the development of the faculties, the relation of the mind and body, the attention, the will, the imagination, and the association of ideas. If now we study these subjects in any pedagogical psychology, we shall find that what is available and useful in them for the teacher is—with one exception—based on common observation rather than scientific psychology. Thus we are told, in an approved text, that the whole system of training should conform to the natural order of the development of the faculties. The value of this statement, however, is destroyed by the declaration immediately following it, that it is a self-evident proposition. Now the order of the development of the faculties, as laid down by psychologists, is; 1, sensation, 2, perception, 3, imagination, 4, conception, 5, judgment, 6, reasoning. The pedagogical value of this order of the development of the faculties will be seen to be nil, if we bear in mind the fact, that long before the child appears in the school room, he is a perceiving, imagining, conceiving, judging, reasoning little animal, and that the first three days of his life are given up entirely to the senses is a rather shiftless fact in the premises.

It may be said, indeed, with a fair degree of exactness, that in the early school life, the faculties develop *pari passu*. The child is taught the qualities of objects, perception; he is asked to talk, to narrate, imagination; he is required to define, conception; he is taught numbers, abstraction—a phase of conception; he is encouraged to draw lessons from stories, reasoning. Here then in the very first months of school life are six faculties to be appealed to and to be developed.

At the basis of all knowledge and all development lie sensation and perception, the building material. The hortation, then, that the child must be taught things, which has been somewhat overvaunted as a valuable contribution of psychology to teaching is, after all, a mere induction from common observation. It is a product of sense rather than of psychology. Every mother teaches her child colors and elemental forms, and not Euclid and algebra. She spares it discussion of original sin and of the *summum bonum*, and lets it look at the light and play with its rattle. If the elaborate system of Froebel with its gifts, and its plays, and its nuances, be adduced as perceptive contributions to education, it is to be answered that the excellence of the system does not depend upon its conformity to psychology, but on its conformity to pedagogy, and that it is no more psychological, no less psychological, than the answer to the anxious mother's question: "When is the best time for my boy to begin a trade?" The fact of the matter is, that every sensible parent and teacher wittingly or instinctively acts upon the principle of multiplying sensations—of imparting knowledge—and leaves the question of direction and emphasis, and generalization, to be determined by (1), the character of the individual child's mind, and 2, the probable exigencies of its practical life, and these are disclosed by direct observation of every particular case and not by general psychological laws. That the output of this psychologic mine is altogether uncertain, is shown by the very words of the psychologists themselves. "The problem," to quote from one of them,

'when to take up the subjects requiring a considerable measure of abstraction, such as the physical sciences, grammar, and so on, is one of the most perplexing ones in the art of education." If no universal rule can be obtained, then we are really left where we were at the beginning; with a series of cases, each to be treated on its own merits.

Let us now examine for a moment the psychology of attention, and we shall find as before that whatever is applicable to teaching is a matter of common observation, an induction of common sense. We are told that the voluntary attention of a child is rudimentary and that its task must be made attractive; that there must be a change of occupation, as the interest in one subject soon flags. All this is very good and very true, but it is constantly employed by mothers and teachers, who do not know what psychology means. Children are given a variety of playthings, they are assigned short lessons, they have fewer hours in school, they are shown pictures, they are given object lessons; all based upon the recognition—oftentimes instinctive—of the weakness of their power of attention. □

The attempt of a distinguished writer in the Nov. No. of the *Ed. Review* to apply some of the subtleties of recent investigations in attention to the usufruct of teaching, altogether misses the mark, for it is not the esoteric subtlety that is helpful but the exoteric principle, just as it is not the pattern of our coat that keeps us warm, but the material of it. In recent years, a number of interesting experiments have been made upon what has been called reaction time; *e. g.*, the time that elapses between the outward stimulation—the strike of a bell or the flash of a light—and the recognition of it as such. This time has been found to be from one-eighth to one-fifth of a second, varying somewhat with the different senses and with the strength of the impression; a loud noise, a bright light, shortening the reaction time. It has been further shown that where the impression is looked for, where the attention is tense and expectant, then the reaction time can be reduced to a practical null. All of these measurements are of profound

interest to our psychologists, but when the above named writer exclaims, "How rich in pedagogic suggestions is the fact brought to light in these researches, that when the mind is beforehand poised or focused for a particular impression, the process of clear apprehension is reduced to minimal limits of time," we must demur—demur because the rich suggestions open out in a commonplace, as his very next sentence shows, "May not all teaching be said to accomplish its purpose by exciting the favorable attribute of expectancy."

Now this is an apt instance of the futility and the inutility of so much of pedagogical psychology. Here is a long and labored deduction of a perfectly patent principle of pedagogy—no knowledge without attention. Every teacher knows that no boy can learn his spelling or his multiplication table, while he is swapping jack knives, nor his reading while he is either agent or receiver in the matter of sticking pins. To make this principle in any way dependent on reaction time is simply to darken counsel with words, and to these interpreters of the ways of psychology to pedagogy, the weary teacher may say with Job: "You are all physicians of no value."

Again the correlation of mind and body, however interesting a subject for study and investigation, is not fruitful in pedagogy. The teacher may not know that fatigue is due to the exhaustion of certain cerebral centres, but he does know that the weary child learns with great difficulty. He knows, too, that by threats and promises fatigue can be temporarily overcome, and the child thus constrained or enticed to learn, and this knowledge is neither strengthened nor weakened by the further knowledge that the threat, the promise, stimulate the nerve centres to a temporary additional activity. Though he may not know the epigram of Feurbach: "Der Mensch ist was er isst," "Man is what he eats," he does know that insufficient and innutritive food weakens the mental powers, and that he is not to expect the same intellectual and volitional accomplishments from the starvling of the slums that he expects from the healthy boy of the well-to-do burgher.

The only subject that is fruitful to education is "Association of ideas." This is the common ground of pedagogy and psychology. The line that connects the sciences is an unbroken one, differing only in breadth and shading. Thus chemistry blends into physics in chemical physics, and physiology and chemistry in physiological chemistry, and so in the association of ideas, the science of psychology passes over into the art of teaching.

The turning, then, of so many psychologists to the subject of education will hardly bring about the revolution in scholastic affairs that Prof. Carveth Read has promised us. The melancholy fact is, that up to this time, the revolutions in education have been wrought by the philistine rather than by the philosopher. The philistine it was, who drove out the old education with its Latin verse and "elegant imbecility"—to quote Sydney Smith—and established in its place the elective system, the school of technology, the school of history and political science, the manual training school, and the industrial school. Much can yet be done to improve methods, and contributions should be welcomed from philosopher and philistine, yet after all, the richest gifts must come from those who work in education as an art rather than study it as a science.

With "The Association of Ideas" embodied in a text book of pedagogy, the teacher would have all the psychology that would be of practical avail to him. That the study of psychology would make him a broader man and a stronger man is a matter of course, but so would a study of physics. The fact of the matter is that every liberal education—meaning thereby the power to orient oneself in the world—must include chemistry and physics which explain the fundamental principles of matter, and psychology, which explains the fundamental processes of the soul. But as one can build a roaring fire without knowing that the approximate formula of wood is $C_{18}\ H_{30}\ O_{15}$, that the air is a mixture and not a compound in proportion of one part oxygen to four nitrogen;

that oxygen unites with the constituents of the wood only at and above such a degree centigrade, that the products of combustion are CO_2, H_2O and pure carbon, and finally that the combustion of wood is merely a specific case of chemical action; so one can teach a child to read by any or all of the approved methods, and can teach it geography with the story and with the moulding board, without knowing the order of the development of the faculties, nor Berkeley's Theory of Vision, nor Lotze's Local Sign, nor Ferrier's Localization of the Brain Function, nor Wundt's Measurement of Reaction Times.

That psychology has disciplinary value only and that the point of direct application to teaching can hardly be found is seen in almost every article bearing upon pedagogy. In the instructive series of articles recently running through "The Forum," by Dr. J. M. Rice, on the public schools of the United States, there is persistent bewailment of the absence of instruction in psychology and pedagogy for the teachers in the public schools. He quotes with commendation the remark of a New York teacher that owing to the complete mechanization of the public school system of New York she could not apply the psychology she had learned at the normal school. Yet when Dr. Rice does find a school where there is freedom and spontaneity of action, the illustrations of excellent work he adduces are invariably from pedagogy, never from psychology. In short, they are tricks of the trade. Take for illustration the article on The Public Schools of Boston. He writes with approval of the George Putnam School, at Roxbury, and describes one or two admirable features. "Another interesting feature of the school, and one that acts as a stimulant to keep alive what the pupils have learned, is what Mr. Clapp calls, 'random recitations.' The last twenty minutes of some of the recitation hours are devoted to these 'random recitations,' which are conducted by the scholars. Four subjects are usually taken up, five minutes being devoted to each, the pupils being allowed

to ask each other any question that they are supposed to be able to answer. After one of the pupils has asked two or three questions he appoints another to take his place During the 'random recitations' the class is full of life and enthusiasm. I found the children very quick and generally well informed. While these recitations are going on, the teacher sits by and takes no part other than keeping the children from going astray."

And again after describing some indifferent work in another school, he writes: "These lessons stand in marked contrast to the geography lesson given in my presence by Miss Rich, the first assistant of the Dwight School, which was one of the best geography lessons I ever attended. The recitation was upon Africa. Geography and history were beautifully interwoven, the pupils were full of ideas, and the enthusiasm throughout the lesson was great." Now the secret of this superior work lies in the words: "Geography and history were beautifully interwoven;" and they resolve into three elements, which are no more psychological, no less psychological than the lawyer's plea before a jury, or a clergyman's sermon at a revival meeting. They are: 1. History and geography are mutually illuminative; 2. Clever literary workmanship; 3. The magnetic temperament.

Pestalozzi is probably responsible for the introduction into education of the nomeclature of psychology. Kant's "Pädagogik," and Pestalozzi's "Wie Gertrud ihre Kinder lehrt," appeared about the same time. Great as Kant was, both as a teacher and a philosopher, yet the word psychology scarcely appears—if, indeed, at all—in the "Pädagogik." Slight as Pestalozzi was as a philosopher, yet he never seems easy until he has reduced every pedagogical method to a fundamental psychological principle. The reduction is oftentimes factitious and spurious, yet it satisfies Pestalozzi's desire for unity and for a scientific basis for his work. Singular it is that, if the connection between psychology and pedagogy is so close, it should

have escaped the greatest philosopher of modern times. Probably Kant was right.

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COMMUNICATION

To the Editor of the School Review :

In a book review written for the April number of the SCHOOL REVIEW, mention was made of a solution of the equation $\sqrt{2x+8} - 2\sqrt{x+5} = 2$ in which + 4 and — 4 were regarded as roots. This solution was criticised on the ground that neither + 4 nor — 4 will render the equation in its present form an identity. The review has called forth some letters of enquiry as to why these answers are objectionable and what method of solution will give the correct roots, if any roots are to be found.

There are very few even of our best algebras that give a comprehensive treatment of equivalent equations, yet a clear idea of their nature and importance is necessary to an understanding of algebra as a science. Very often, to be sure, algebra is taught as an art rather than as a science ; but even as an art, algebra loses much by not considering the equivalence of equations. Some of the ordinary methods of solving algebraic problems are likely to introduce or eliminate one or more roots, and so we frequently find that the answers to problems given in some text-books in common use are incorrect, that is, when these answers are substituted for the unknown quantity, they will not satisfy the original equation. Especially is this true of equations containing surds.

It has been proved that every rational integral equation has a root ; and, also, that the number of roots of every such equation corresponds to the degree of the equation. Thus, an equation of the second degree has two roots. In all the realm of real and imaginary numbers, there are to be found two quantities, and two only, that will satisfy any given equation

of the second degree. An equation of the third degree has three roots, and so on. Is it possible to apply either of these principles to equations containing surds? Some maintain that the first principle is general; that every equation has a root, real or imaginary. But in order to prove this statement they give to the radical sign a double meaning. For example, such an equation as the one mentioned above would have, according to their explanation, four distinct interpretations. They let each radical sign stand for both the negative and the positive root, and thus by combining the different values of the surd expressions in all possible ways, they have four equations instead of one. In the following discussion the radical sign, when preceded by the sign —, will stand for the negative root of the radical expression, and when preceded by the sign + (either written or understood) will stand for the positive root. Inasmuch as in algebra the sign + is understood to precede every term that is preceded by no written sign, this leaves no chance for ambiguity. Further, it does not contradict what pupils learned of the radical sign during their study of arithmetic, but is the view they naturally will take if left to themselves. Taking this point of view, the equation $\sqrt{2x+8} - 2\sqrt{x+5} = 2$ becomes easy to understand. We find that it has no root whatever.

$$\text{Let } \sqrt{2x+8} - 2\sqrt{x+5} = 2 \tag{1}$$

Squaring both numbers and transposing 2^2, we have

$$[\sqrt{2x+8} - 2\sqrt{x+5}]^2 - 2^2 = 0. \tag{2}$$

By factoring we find equation (2) equivalent to

$$[\sqrt{2x+8} - 2\sqrt{x+5} - 2]\,[\sqrt{2x+8} - 2\sqrt{x+5} + 2] = 0 \tag{3}$$

Since equation (3) is satisfied when either factor equals zero, it is equivalent to the two equations:

$$\sqrt{2x+8} - 2\sqrt{x+5} - 2 = 0 \tag{4}$$

$$\sqrt{2x8+} - 2\sqrt{x5+} + 2 = 0 \tag{5}$$

It will be seen that the root of equation (5) has been introduced by squaring. A correct solution of (2) will give all the

roots of both (4) and (5). When (2) is reduced it still contains surds, therefore we square again and have

$$9x^2+72x+144=4(2x+8)(x+5). \tag{6}$$

Transposing and factoring as above we find equation (6) to be equivalent to the four following equations:

$$\begin{cases} \sqrt{2x+8} - 2\sqrt{x+5} = 2 & (7) \\ -\sqrt{2x+8} + 2\sqrt{x+5} = 2 & (8) \\ \sqrt{2x+8} + 2\sqrt{x+5} = 2 & (9) \\ -\sqrt{2x+8} - 2\sqrt{x+5} = 2 & (10) \end{cases}$$

The roots of equations (8) (9) and (10) have been introduced by squaring. A correct solution of equation (6) will give all the roots of each of these four equations. Now, the only roots found are + 4 and — 4. Each of these roots satisfies equation (8), but fails to satisfy any other of the four. Therefore, the original equation, as well as each of the equations (9) and (10), has no root.

The four equations to which equation (6) is equivalent are precisely the same as the four equations formed by combining the positive and negative values of the radical expressions in all possible ways. If we had started with any other of the four the result would have been the same.

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BOOK REVIEWS

National Geographic Monographs, Nos. 1–7. American Book Company, New York.

The later aspects of geography, as dependent upon geologic structure and history, have not yet become incorporated in general literature, or in text books. To meet this need and to "supply to teachers and students of geography fresh and interesting material with which to supplement the regular text-book," the National Geographic Society at Washington has arranged for the issue of this series of ten quarto pamphlets, appearing monthly. The authors and titles are the best index to their character and value. Major John W. Powell prepares Nos. 1–3, upon Physiographic Processes, Physiographic Features, and Physiographic Regions of the United States. Others are: Beaches and Tidal Marshes of the Atlantic Coast, by Professor N. S. Shaler; Present and Extinct Lakes of Nevada, by Professor I. C. Russell; The Northern Appalachians, by Bailey Willis, and Niagara Falls and its History, by G. K. Gilbert. A later number will contain an account of "The New England Plateau," by Professor W. M. Davis. The National Geographic Society, which has been abundant in recent explorations, now supplements such original work in a most proper and gratifying way, by illustrating in popular form the principles upon which the new geography is founded. The price ($1.50 for the ten monographs) puts them within reach of every teacher.

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Grammar School Algebra. By WM. M. GIFFIN, Chicago: The Werner Company, 1895. pp. 128. Price 50 cents.

This little work by one of the leaders in elementary education in the West should be examined by all teachers who are interested in the proper introduction of algebra in the grammar school. The author has set about to follow "the well-known pedagogical principle, 'The primary concepts and ideas in every branch of knowledge should be taught objectively in all grades of school.'" In following out this principle as to elementary algebra he has succeeded; for this the book should be commended, and for this it deserves the careful attention of teachers.

It is, however, a misfortune that this excellent principle has been followed so intently, so blindly one might say, as to open a considerable field for just criticism. This is not because the principle itself has been made prominent, but because other principles of pedagogy equally important have been either violated or neglected, apparently through mental absorption in this particular one.

For example, it is equally an axiom of pedagogy that any presentation that is necessarily narrowing to the mind, that tends to preclude a clear understanding of succeeding steps, is unscientific. Such is the presentation of powers of a number. "When told to square 2, of what is one to think?" The pupil is then *told* that he is to think of a geometric square, which not only raises the question as to whether this is heuristic teaching, but also as to what geometric figure will occur to him when he meets the fifth power on the succeeding page. Indeed, in thinking of powers and roots is not the geometric concept exactly the one that ought not to be made prominent? Is it not the very one that raises false ideas of the subject and unnecessarily limits the view? Those who have tried to explain what is meant by a surd number hold to this view.

It is also a principle of pedagogy, very old and doubtless somewhat abused, that exact language should be used in this exact science. Dr. Giffin makes a distinction between *numbers* and *quantities*, using the former term where Indian ciphers are employed, and the latter for letters. He then proceeds to speak of multiplying two quantities together,—an expression that might have been right enough had he not made this distinction. Indeed at the very beginning he speaks of multiplying two lines, x, y, together,—a pardonable convention of speech if clearly understood, but a dangerous one as here presented. The expression, "multiplying by quantities," where the quantities may be lines or cubes or dollars, is frequent.

In the language of Col. Parker, quoted at the beginning (p. 5), "Thinking is not in itself educative; it becomes educative only when the conscious action is intense," etc. This principle is repeatedly contradicted by the presence of ready-made answers to the questions. One is constantly reminded of the catechism, the most unpedagogical book in circulation, and the last one that Dr. Giffin would consciously select as a model. Too many of the questions admit of the mere answer Yes, or No, and a considerable number have the answers given either directly or

in the opening of the next question. Indeed the whole system of questioning seems an attempt to do away with a live teacher. At times one is reminded of the story told of the Normal teacher who was developing a lesson; one of the children remarked, "You want to get this answer, but those questions won't bring it." Such a question is given in ex. 270, where "the shortest answer" is demanded; this will be given by any bright school-boy as $4y$; duller ones may give $4(x+z)$; still duller, $2(x+y+z)$ which has already been suggested (p. 17); but the author is trying to get (see his printed answers at the back of the book) $2x+2y+2z$.

Faulty mathematical forms placed before children are with difficulty eradicated from their memories. Such forms are much too frequent. (See exs. 279*b*, 442, 443, 444, p. 72 last line, *et pass.* If it is claimed that exs. 442-4 are correct, then exs. 621–6 are faulty.)

Unfortunately, too, the English is not always pure. How will this sentence impress a child? "*Algebraic* division is the process of finding how many algebraic quantities, *and in what manner*, one of them must be taken to produce the other." Were this an isolated example it might be overlooked.

Of the several mathematical inaccuracies that on page 93, denying the Pythagorean theorem, is the most unaccountable.

The termination of the course by four pages of rules is surely a questionable piece of pedagogy.

On the whole the problems are quite fresh, though hardly what might have been expected from a school where science in the grades plays such a prominent part. The old problem of Metrodorus (310 A.D.) and one or two problems from the mediæval schools have, however, hardly been changed.

It is ungenerous to speak lightly of a serious effort. But the book lays itself open to such criticism as to preclude extensive use until a revision has been made It should be critically examined by some teacher of mathematics before it appears in a second edition.

David Eugene Smith
Michigan State Normal School, Ypsilanti

F. Klein, Vorträge über ausgewählte Fragen der Elementargeometrie. Ausgearbeitet von F. Tägert. Leipsig, Teubner. 1895. pp. 66 + v, with plates.

This little work, issued at a nominal price, deserves a prom-

inent place in the library of every teacher of elementary geometry. It is very rare that a man of Professor Klein's ability in the higher mathematics condescends to take up questions that are quasi-elementary, or, doing so, treats them in a manner at once scholarly and intelligible to those who are not his peers. Every teacher of elementary geometry knows that an angle cannot be trisected by means of the straight edge and compasses. Yet it is probably within the truth to say that many more than half of such teachers have a lingering idea that, after all, somebody may some day succeed in solving the problem by some happy chance. Most teachers have heard of the discovery of Gauss that added the regular 17-gon to the list of inscriptible regular polygons below a hundred sides; but what the nature of the construction is, or where to read about it, is all unknown to them. Everyone has a notion that π is an incommensurable number, and occasionally some class hears that this was proved not long ago by Lindemann, but as to the nature of the proof, or as to its whereabouts, few can tell.

For all teachers who are interested in these questions, this is the book. It is divided into two parts. The first deals with the possibility of the construction of algebraic expressions, the second with transcendent numbers and the quadrature of the circle. The Delian and the trisection problems, the partition of the circumference, the construction of the regular 17-gon, and a chapter on higher plane curves are features of the first part The second part contains chapters on the Cantor proof of the existence of transcendent numbers, a historical survey of the attempts at the computation and construction of π, the transcendence of e, and the transcendence of π. The style is as attractive as the book is valuable.

David Eugene Smith

Michigan State Normal School, Ypsilanti.

Hall and Knight, Elementary Algebra. Revised and enlarged for the use of American Schools. By F. L. SEVENOAK. New York: Macmillan and Co., 1895. pp. 478 + x.

Hall and Knight, Algebra for Beginners. Revised and adapted to American Schools. By F. L. SEVENOAK. Macmillan and Co., 1895. pp. 188 + viii. Price 60 cts.

In the Elementary Algebra we are treated to a good book made better. Hall and Knight's works have been and are extensively used in England, and not a little in America, and their

popularity is well deserved. They supply a need in the way of text-books pitched a degree higher than the ordinary run of school literature. They are books that make students think, and hence this revision should be well received in this country.

The reviser was confronted by the initial dilemma of whether to revise down to easy popularity, or up to a few schools. He chose the latter plan and made of the Elementary Algebra a work that few preparatory schools will complete. The book is too extended for the high schools and too elementary for the colleges. The fault may be with the former institutions, but the fact remains.

The revision consists chiefly of two features: (1) the rearrangement of material in the English edition, and (2) the introduction of several subjects from the author's Higher Algebra, with the necessary changes from pounds to dollars in many problems. In the way of rearrangement the revision is in the main successful. One unhappy feature of the original is the separation of related subjects and the frequent departure from a natural sequence. In the revision, the chapter on fractional equations has properly been postponed until fractions have been treated, a change that has resulted, however, in several little inconsistencies (v. pp. 54, 56, 57, 93, 94, and especially 91). The chapter on factoring which formerly followed evolution and some work with fractions, now precedes these subjects. The break of fifty pages in the treatment of highest common factor is closed, and the subject is followed, as it should be, by the work in lowest common multiple.

In the way of new chapters there are several valuable additions. The one on Indeterminate and Impossible Results, while wanting in problems and not carefully written, deserves the place assigned to it. Condensed or quite verbatim from the author's Higher Algebra are chapters on Inequalities, Equations in Quadratic Form, Imaginaries (strangely wanting in the original,) Probabilities, Annuities, Limiting Values and Vanishing Fractions, Undetermined Coefficients, Continued Fractions, Binomial Theorem for any Exponent, Determinants, and Logarithms. The last named chapter is much improved by a small table and directions for its use.

It would be strange, however, in view of the differences of national tastes and the danger of tampering with another's arrangement of matter, if there were not radical differences of opinion as to some of the features of the work, as well as

numerous inconsistencies of sequence. The ubiquitous rule, that idol of British pedagogy, retains a power only slightly diminished by the reviser; the change of place of the chapter on fractions leaves an inconsistency on page 91 that did not exist in the original; the theory of fractions is practically starred, while the equally difficult theory of multiples and measures is not; the British decimal point, so long since abandoned by most American writers, is retained for no apparent reason; circulating decimals are freely used despite the fact that a considerable proportion of our high school students are ignorant of them; the ancient terms in proportion, used less and less in the mathematical world, are retained, all but one (*ex aequali*) of the Latin forms being put into English, however; an algorithm for multiplication is used with no explanation (p. 360), although it is probably no more intelligible to a beginner than is the form with detached coefficients; "adfected" is happily Americanized, although it is inadvertently left on page 184. The American teacher will probably not take kindly to the introduction of the new chapter on Annuities, a subject useful enough in England, but of no great value *per se* in this country. The policy of the retention of the conventional treatment of Harmonical Progression (even with the successful condensation) may also be questioned, as may the wisdom of such captious as "Harder Factors," and "Harder Problems."

It would likewise be strange if some difference of opinion did not exist as to what might be introduced into a high grade textbook, and as to where the new matter should be placed. There seems no good reason why a chapter on Determinants should be almost the last one in the book; if it is to be in at all, why not place it where it can be used? Similarly as to such a powerful tool as the Remainder Theorem; why such a subject should not precede factoring, and why a considerable discussion of symmetry should not go along with it, and why the simple checks on operations should not be given early in the course, and why the very usable method of operating with detached coefficients should be so postponed,—these and similar questions will suggest themselves to many teachers of the rank of those who will use this book. Euler's treatment of the binomial theorem will not be acceptable, in the manner here presented, to most teachers.

There is not a large amount of new matter in the work. What there is will not be free from criticism. For example: "If we were to write the largest possible number . . . we

should have a number called *infinity*." "If we write the smallest decimal fraction possible . . . we have a decimal fraction called zero." "We might be required to find the value of the fraction $\frac{.0001}{.0003}$, which we cannot do satisfactorily without knowing what the next decimal figures should be."

The reviser was undoubtedly annoyed, as the reader of the work will surely be, at the attempt to use the old plates with the new. The break in the styles of type is quite noticeable (v. pp. 64, 79, 129, 133, *et passim*), while lack of uniformity in the length of the pages (*e. g.*, pp. 74 and 75, 80 and 81, 82 and 83, etc.) and the imperfections in the old plates (*e. g.*, pp. 84, 121, etc.) detract considerably from the appearance of the work.

The Algebra for Beginners has not been so thoroughly revised as the Elementary Algebra. It differs little from the English edition save as to the applied problems. Here the difference in the monetary standards has made a number of changes necessary, and in these cases the difference in the typography is unpleasantly noticeable. Although quite elementary, the work is so much superior to several popular American text-books for beginners that it is to be hoped that it may find a place in our schools.

David Eugene Smith
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Introduction to Elementary Practical Biology, a Laboratory Guide for High-School and College Students. By CHARLES WRIGHT DODGE, Professor of Biology in the University of Rochester. pp. xv+422. Harper and Brothers. New York. 1894.

As stated by the author in the preface, this book is not a text-book in the ordinary sense of the word, but has to do entirely with the actual work of a laboratory. The purposes of laboratory study are thus admirably stated: (1) To teach the student to observe correctly; (2) to distinguish essential from non-essential facts; (3) to draw proper conclusions from the facts observed, and (4) to express in writing and by means of drawings the results obtained. To develop these powers in biology the work is fairly evenly divided between botany and zoölogy, and "consists essentially of questions on the gross and minute structure, and on the physiology of a series of common animals and plants which are typical of their kind,—

questions which can be answered only by actual examination of the specimens, or by the performance of the experiments."

The study is begun with the simplest or unicellular animals and plants, and with the cellular elements of higher forms, then for the biology of the animal the following are considered: Sponge, fresh-water polyp, campanularian hydroid, star-fish, earth-worm, lobster or cray-fish, locust (grasshopper), fresh water mussel, and frog. For the biology of the plant the author has selected the following: Green felt, stonewort, rockweed, mould, mushroom, liverwort, fern, and a flowering plant, as the bean.

The work has the admirable feature of combining the study of the structure and the function together. Indeed the student is advised to have a living specimen before him while dissecting a dead one so that there may be kept constantly in mind the purpose of the different structures. One might as well set the pupils at Chinese puzzles as anatomy unconnected with physiology. The directions for the student have the clearness characteristic of a teacher thoroughly familiar with the difficulties met by beginning students, and while they are full they are so carefully given that the learner must use his own best efforts to attain the end. The chapter on the locust (grasshopper) is especially to be commended. The insects form so large a part of the animal kingdom and have such intimate relations with plant life that it is a source of surprise that they have not formed a part of every work on biology for the training of students. It seems to the reviewer also that it is a serious mistake to devote so much attention to the invertebrates and to ignore the group of mammals to which the student himself belongs. If a mammal like the cat, closely resembling man in structure and food, were studied there would be the added interest arising from personal grounds. Certainly as all biology teaches *purpose*, the student, stimulated by a definite, practical, and personal interest, will give closer attention than when the connection with himself and his interests is more remote. It is hoped that in a future edition the author will add a mammal to his already well selected series.

No figures are given, but doubtless the author would agree that visual aids are of the greatest help and should be supplied by the teacher in his lectures and discussions.

In a book of instruction the arrangement of the matter is of prime importance. In this one the simple is placed first and

the pupil is gradually introduced to that which is more and more complex. This is the order followed by his prototype, the Biology of Huxley and Martin, in the first edition, but reversed in the second edition. At the first glance the question of arrangement seems simple enough, and doubtless most teachers would agree with the author that the simple should precede the complex; but, as in so many cases, two principles come into collision here. The complex forms, flowering plant, frog, etc. are more or less familiar to the pupil, while the simple forms are of microscopic size and wholly unknown to him. In taking the simple first, then, the student must study what is wholly unknown and in addition make use of a microscope and interpret the appearances through it. Dr. Dodge has duly considered this matter in his book and states that the chapters are so far independent that they may be taken up as best suits the teacher. He justifies the order from the simple to the complex rather than from the known to the unknown by the following very clever statement which is not easily controverted: "As a matter of fact beginning students have no more real knowledge of the higher [complex] than of the lower [simple] forms."

A commendable feature of the book is the reference to special works relating to the different forms studied. If in the questions the student finds those apparently wholly unanswerable from his present knowledge he is liable to be stimulated to investigate the matter further, and in the special works a great new world will be opened up to him. For example, if his own investigations are inadequate,—as they certainly will be,—to answer many of the questions, as that on. p. 25 *b*, ("of what use could this property—[*i. e.* the property of ingestion of foreign particles—] of the cell be in the frog?"), he will naturally turn to some of the larger special works, and they will give him a glimpse of the vast fields to be explored and thus stimulate his intellect and arouse his enthusiasm.

Probably no teacher of experience would affirm that any subject whatsoever appeals to all minds no matter how well presented by book and teacher; but for those minds with a special taste for biology or of such perfection that every subject is interesting, books like this are sure to serve as the most efficient agents in education, for they make the subject real and thus give the pupils a notion of how the splendid results of the great masters are attained.

S. H. Gage
Cornell University

A Manual of Pedagogics. By DANIEL PUTNAM, A. M., with an Introduction by RICHARD G. BOONE, A. M., Ph. D. Silver, Burdett & Co., Boston.

This manual contains the substance of the instruction given at the present time in the Michigan State Normal School upon the general application of psychology to the science and art of teaching. While this work covers the usual territory appertaining to such a manual successfully, it has certain special points of interest worthy of mention. These are all really summed up in the statement that it is written from the latest modern standpoint. In consequence of this we find many definitions revised in accordance with the newest thought. There is special recognition of the influence exerted by recent developments in child study and Herbartianism. Chapter thirteen, on the selection and arrangement of studies, is very largely a presentation of Herbartian ideas. Chapters fourteen and fifteen, on the study of the child, give an excellent summary of the aims and methods and some of the results of present activities in that line. The author's treatment of concentration accepts entirely the view of the "Illinois school." "The doctrine of concentration is in substance that some one study should be selected as the core or centre of all instruction, and that other branches of study should be subordinated to this central subject--should radiate from it as spokes from the hub of a wheel, or should cling to it as iron filings to a magnet." This is unquestionably the doctrine of concentration as presented by all the Herbartian writers in the United States, but it is an outrage to connect Herbart's name with it. He never perpetrated any such freak. On this point our author well says: "Under exceptionally favorable conditions it may be practicable to arrange the curriculum for a small school by concentrating all the studies around some single, central core, but for the present at least this plan cannot be adopted in the ordinary schools. No single subject can be found around which all other subjects of instruction will naturally group themselves into a position of subordination." Each chapter closes with a brief bibliography. It is the easiest thing in the world to make a bibliography, and perhaps the hardest thing to make one good for anything. What makes a bibliography good or bad is not so much the books included as those that are left out. In this work the proper books for exclusion are, with possibly a single exception, left out.

John Dalton and the Rise of Modern Chemistry. By Sir HENRY E. ROSCOE, D. C. L., LL. D., F. R. S. New York and London: Macmillan & Co, 1895. Price, $1.25.

This is a charming book, giving, as it does, the details of the life of one who is regarded as the founder of modern chemistry and the atomic theory, and the discoverer of the laws of chemical combination.

The fact that the author of the book is a man eminent in the same profession, and whose work is carried on in the same city in which Dalton lived and died, adds to the interest which a scientist would naturally have in such a work.

There have been a number of memoirs of Dalton, written by pupils and friends. The author refers to many of these and has given us the best from each of them. The work is full of anecdotes of Dalton's life and work. A very complete index adds much to the value of the book.

Colgate University *J. F. McGregory*

Analytical Chemistry. By N. MENSCHUTKIN, Professor in the University of St. Petersburg. Translated from the 3d German Edition, under supervision of the author, by JAMES LOCKE. London and New York: Macmillan & Co., 1895. Price, $4.00, net.

The work of Professor Menschutkin has for many years been known and favorably regarded by analytical chemists, who will welcome this translation.

The author takes it for granted that the student has a thorough knowledge of general chemistry before beginning his laboratory work. In part first, Qualitative Analysis, there are three sections, successively treating the metals, and the metalloids, and giving preliminary operations. Under the head of "General Reactions" the corresponding compounds of all the metals of a group are studied, and also the conditions necessary for separation of one group from another. The "Special Reactions" include such as are necessary to detect each individual metal. The separation of the groups is explained in the same way. The rare metals are not included in the general scheme, but are given a place in the supplements to the different groups.

In studying the metalloids the reverse order is followed, special reactions being first considered. The second part, Quantitative Analysis, is also divided into three sections, the first giving gravimetric analysis, the third the analysis of organic compounds.

Colgate University *J. F. McGregory*

NOTES

The completed edition of the Heart of Oak Books announced more than a year ago has just appeared over the imprint of D. C. Heath & Co. The complete series consists of six graded books, instead of five, as originally announced. Beginning with the rhymes and jingles of child-literature, and passing through the various stages of fairy stories, tales from mythland, and hero-stories, the higher books of the series contain the gems of classic literature. Their preparation is the work of Professor Charles Eliot Norton of Harvard University, assisted by Mr. George F. Browne, Associate Principal of the Browne and Nichols School, Cambridge, and Miss Kate Stephens, New York city.

The same house has in press for immediate issue in "Heath's Modern Language Series," Corneille's *Le Cid*, edited with introduction and notes by Professor F. M. Warren of Adelbert College; and Lessing's *Emilia Galotti*, edited with introduction and notes by Professor Max Winckler of the University of Michigan. The introduction to the latter contains a discussion of the work as a dramatic master-piece, and aims to interpret it and its relation to German literature. The notes are largely devoted to the dramatic technique of the work.

Harper & Brothers have just published *An English-Greek Dictionary*, being a concise dictionary of the English and Modern Greek languages, as actually written and spoken, by A. M. Jannaris, Ph. D.

The important articles on "Money, Banking, and Currency," which appeared in *Harper's Weekly*, beginning in the number dated March 9th, 1895, have been collected and published in book form, with illustrations by W. A. Rogers and Thomas Nast. This timely book is entitled *The Money We Need*. Its author is Henry Loomis Nelson, editor of *Harper's Weekly*.

The very thorough studies which Edwin A. Abbey made in preparation for the work of illustrating Shakespeare's Comedies were prosecuted in Italy, England, and elsewhere, at the places chosen by Shakespeare for his "scenes." These drawings, therefore, have the merit of showing the people of the Comedies properly circumstanced, with all details and accessories, such as architecture and furniture and dress, in faithful representation. One hundred and thirty-one of Mr. Abbey's drawings, reproduced by photogravure, will illustrate the four-volume edition of the Comedies which Harper & Brothers will soon publish. The text is that of the folio of 1623, with obvious errors corrected and the orthography modernized, and with the retention of passages which occur in the folio just mentioned, but which many editors, for one reason or another, or wholly without justification, have omitted.

Among recent announcements of Harper & Brothers are *Practical Exercises in English*, by Huber Gray Buehler, Master in English at the Hotchkiss School. This volume is arranged for use with Adams Sherman Hill's

Foundations of Rhetoric, and *Other Times and Other Seasons*, by Laurence Hutton, author of *From the Books of Lawrence Hutton*, *Literary Landmarks of Jerusalem*, etc. In a prefatory note to the latter, Mr. Hutton says: "I am prepared to affirm, on information and belief, that the facts herein set down have never heretofore been gathered together in any single volume."

Recent French text-books announced by William R. Jenkins, New York, are the following:

La Fille de Roland. Drame en Quatre Actes en Vers, par le Vicomte Henri de Bornier, de l'Académie Française. No. 15 *Théatre Contemporain*. Edited, with introduction, grammatical and explanatory notes, by Wm. L. Montague, Ph.D., Professor in Amherst College. 12mo. paper, 129 pages. 25 cents.

Le Française Idiomatique. By Victor F. Bernard. 12mo. cloth, 73 pages, 50 cents. The French Idioms and Proverbs, with French and English exercises, are alphabetically arranged and especially adapted for school use.

Athalie. By Jean Racine. With a Biography, Biblical References and Explanatory Notes in English by C. Fontaine, B.L., L.D., Director of French in the Washington High Schools. No. 6 *Classiques Francais.* 12mo. paper, 111 pages, 25 cents.

The Mottoes and Commentaries of Friedrich Froebel's Mother Play, the new version by Miss Susan E. Blow, has just been published by D. Appleton & Co. as Volume XXXI of The International Education Series. This is to be followed by another volume, *The Songs and Music*, to complete the work.

Miss Blow has drawn upon all the resources of her experience and study to make this edition a helpful handbook for mothers and teachers in the education of children. The educational principles of Froebel, which have been found so productive of good results, have been preserved and adapted to modern ideas and canons. The improved forms will be especially noticeable in the new translations of the poems by Mrs. Emily Huntington Miller and others, and in the new music prepared especially for the improved renderings of the songs in Part II. The quaint and instructive illustrations in the fine Lange edition, now out of print, have been, with the exception of imperfections in the original drawings, faithfully reproduced.

The Directors of the Old South Work, Old South Meeting House, Boston, have sent us the following announcement:

Seven new leaflets have just been added to the Old South series, all relating to English Puritanism and the Commonwealth. They are numbered 58 to 64, and are as follows: No. 58, Hooper's Letters to Bullinger; 59, Sir John Eliot's "Apology for Socrates"; 60, Ship-money Papers; 61, Pym's Speech against Strafford; 62, Cromwell's Second Speech; 63, Milton's "Free Commonwealth"; 64, Sir Henry Vane's Defence. There are many earlier leaflets in the series relating to the same period, including Vane's "Healing Question," the Petition of Rights, the Grand Remonstrance, the Scottish National Covenant, the Agreement of the People, the Instrument

of Government and Cromwell's First Speech. With these Old South leaflets, which are sold for five cents a copy, just enough to cover their cost, students can come into immediate touch with the men of the English Commonwealth and the great scenes in which they acted. These men and events were as truly a part of American as of English history, as it has been a main object of the Old South lectures of the present year, on the Puritans in Old England, to point out. It is pleasant to know that these leaflets are coming into general use in the schools and being circulated throughout the country. Their publication in this cheap form is one of the best features of Mrs. Hemenway's noble benefaction.

Ginn & Company send us the following announcements:

Studies in the Science of Drawing in Art. By A. Osborne Moore.

College Series of Greek Authors. Eight Orations of Lysias. Edited, with introduction, notes, and critical and other appendices by Morris H. Morgan, assistant professor in Harvard University.

Outline of the Philosophy of English Literature. By Greenough White, A. M., B. D., author of *A Sketch of the Philosophy of American Literature.* Part I: The Middle Ages.

Elements of Plant Anatomy. By Emily L. Gregory, Botanical Department, Barnard College.

The latest issues in the *Riverside Literature Series* of Houghton, Mifflin & Company, are: No. 83, George Eliot's *Silas Marner*, (double number, paper, 30 cents; linen, 40 cents). No. 84, Dana's *Two Years Before the Mast.* (Quadruple number, paper, 50 cents; linen, 60 cents.) No. 85, Thomas Hughes's *Tom Brown's School Days.* (A Quadruple Number.) Paper, 50 cents; cloth, 60 cents. No. 86, Sir Walter Scott's *Ivanhoe*, (A Quadruple Number.) Paper, 50 cents; cloth, 60 cents. Each book will be unabridged, and will contain a biographical sketch of the author.

To make the cloth bound numbers of the *Riverside Literature Series* more suitable for library purposes, a new and attractive cover design has been made, which will be used in the future.

With the September, 1895, number of the *Kindergarten Magazine*, (Kindergarten Literature Co., Chicago,) began a regular normal training course, as thoroughly carried out as can be possible in print. Annual subscription, $2.00. The complement to *Kindergarten Magazine* is the *Child-Garden*, bringing to the juveniles the Story, Song, and Play of the Kindergarten world; $1.00 per year.

A series of papers on the *Principles of Taxation*, by Hon. David A. Wells, is to begin in the November *Popular Science Monthly.* The same number will also contain a discussion of *Primigenial Skeletons, the Flood, and the Glacial Period* by H. P. Fitzgerald Marriott. It will contain descriptions of three skeletons found in caves near Mentone in 1892 and 1894, with pictures of them as they lay in the floor of the cave.

We are requested by the Secretary of the Michigan Schoolmasters' Club to state that the next meeting of the Club will be held at Ann Arbor, November 29, 30, 1895.

The appearance of a third edition of *Seyffert's Dictionary of Classical Antiquities*, edited by Nettleship and Sandys, deserves notice. On its first publication in 1891, this work met with instant success, so that a second edition was called for the same year. Dr. Sandys was thus enabled to add throughout the work references to Aristotle's Constitution of Athens, and to make minor corrections. In the third edition, sent forth early this year, the most important changes have been made in the articles on *Comitia*, *Music*, and *Theatre*. Besides these changes many inaccuracies have been removed, so that the work is better than ever adapted to its purpose as a reference book. For the use of young students there is no work so trustworthy as this, and in the range of subjects treated it is much more comprehensive than most dictionaries of antiquities, for it includes within its scope both mythology and literature. Many of the most important articles are by the English editors, who have also made valuable additions to the illustrations of the work. The latter are, as a whole, superior to the cuts in the latest edition of *Smith's Dictionary of Antiquities*, and are a most valuable feature of the work. The dictionary should be in the hands of every young student of Latin or Greek; certainly no school library ought to be without a copy. The New York publishers are Macmillan & Co. Price, $3.00.

The publishers of the *Banbury Cross Library* have thought that beautiful paper, elegant typography, and tasteful binding are no less good for the little folk than for their elders. Accordingly they have issued in exquisite style the twelve little volumes edited under the above title by Grace Rhys. The stories are the old familiar tales: Jack the Giant Killer, Beauty and the Beast, Cinderella, Ali Baba and the Forty Thieves, etc., that have delighted generation after generation of children, and perform an indispensable office in the education of every normally trained child, but they can hardly have appeared before in a style so attractive, and we could readily sympathize with the parent who should envy his child the possession these pretty books. The illustrations are very numerous and artistic, those in particular in the volume of nursery rhymes being of unusual merit. The London publishers are J. M. Dent & Co., and the set in a neat box is sold in New York by Messrs. Macmillan & Co. Price $6.50.

The Department of Public Instruction of the State of New York has been obliged, in response to numerous inquiries, to send forth an official interpretation of Chapter 1041, Laws of 1895, entitled, "An act to amend the consolidated school law providing for the study of the nature and effects of alcoholic drinks and other narcotics, in connection with physiology and hygiene in the public schools." This document, which is too long for us to reprint, gives the law in full and then sets forth line by line the interpretation by the Department. It would seem to answer all questions that could possibly arise, either on the part of teachers or school officials, in regard to their duties under the new law, and all interested can procure the circular from the Department.

That publishers should undertake such a work as "Four American Universities" (Harper & Bros., New York) is a splendid testimony to the interest now felt by the American public in its great universities. Harvard, Yale, Princeton and Columbia,—these are the four institutions represented. We need have no quarrel with the choice since no where in the book are any odious comparisons. Professor Norton writes of Harvard, Professor Hadley of Yale, Professor Sloane describes Princeton, and Professor Brander Matthews writes up Columbia. It would have been difficult to select from any American universities four authors from whom a higher type of literary excellence or more variety in style could have been expected, nor are these high expectations anywhere disappointed. The literary flavor of the work is delightful.

What each author really does is to draw a brilliant pen picture of his own university. There is enough of the historical to furnish a setting, but the main effort of the authors seems to have been to catch the subtle essence of university life and condense it into nouns and verbs. Not only do we see splendid bird's-eye views of these several great universities, not only are the pages dotted all over with the best kind of pictorial illustrations, but over all this hangs the spirit of Harvard, of Yale, of Princeton, and of Columbia. It is this spirit, vague perhaps, but tantalizing, which gives these pages their exceptional charm. The book is a splendid one from every point of view. The skill of the printer and artist seldom finds a better illustration. Not the least interesting feature of the book to many readers will be the incidental discussion in the articles on Yale, Princeton, and Columbia of the problem of the college in the university. Whether the college in its integrity can be preserved as part of institutions which are becoming or have become universities in a large sense, or whether the college must be henceforth a smaller, separate, and preferably a rural institution, is certainly one of the problems which is not yet solved to everybody's satisfaction.

Messrs. Macmillan & Co. have sent us the first volume of Leaf and Bayfield's edition of the Iliad, the most recent volume in the "Classical Series." In several respects this is a notable text-book. The larger edition of Dr. Leaf is well known, and Mr. Bayfield seems to have been very successful in adapting the commentary of the larger work to the wants of young students. The most striking feature of the work is the employment, so far as we know, for the first time in a school book of the new Greek type designed for Messrs. Macmillan & Co. by Mr. Selwyn Image. The result is a strikingly beautiful page, to which we should say, from slight experience, the eye would quickly accustom itself. Whether the employment of this type in a school book will create an additional difficulty for our pupils is a question which use alone can answer; but meanwhile we should feel thankful that the enterprise of Messrs. Macmillan & Co. has permitted us to make the experiment.

There are two introductory chapers. The first gives in succinct form some of the more important results of the higher criticism, and the second, more extended, sets forth the peculiarities of the Epic dialect. Of the four appendices which discuss the antiquities, the first contains what is perhaps

the most important feature of the work. In it the editor gives a brief résumé of the principal features of Wolfgang Reichel's treatise, "Ueber Homerische Waffen," the conclusions of which Mr. Bayfield everywhere adopts. Many secondary teachers will probably owe to this book their first acquaintance with the views of Reichel, concerning which Mr. Bayfield says that, if they are correct, "almost everything written on the subject previously to the appearance of Dr. Reichel's revolutionary work has ceased to be of any value." Those interested in the subject may be glad to note in the Zeitschrift für die österreichischen Gymnasien, of Sept. 18th, a long reply by Dr. Reichel to the review of his work by Director Scheindler, which appeared in the same journal May 22, 1895.

CURRENT EDUCATIONAL LITERATURE

The Forum, October, 1895.

The Renascence in English. By Richard Burton.

Higher Pay and a Better Training for Teachers. By Jno. Gilmer Speed.

The Popular Science Monthly, October, 1895.

Professional Institutions. VI. Man of Science and Philosopher. By Herbert Spencer.

Studies of Childhood. XI. Material of Morality. (Continued.) By James Sully, M. A., LL. D.

Cosmopolitan Magazine, October, 1895.

State Universities. By Richard T. Ely.

Blackwood's Magazine, September, 1895.

Oxford Then and Now.

The Nineteenth Century, October, 1895.

The Proper Pronunciation of Greek. By J. Gennadius.

A Great University for London. By the Right Hon. Lord Playfair.

The Epoch, (Washington, D. C.) April, 1895.

Laboratory Methods in the Washington High Schools. By C. M. Lacey Sites, A. M., Principal of the Eastern High School, Washington.

It is a large part of the mission of the secondary school to give to the mind of the pupil a strong and healthy development in the recognition of relations between man and man and between man and the physical world about him.

To understand his relations to things, the pupil must come into close contact with things. It is with this general idea—the necessity of training the boy or girl to search out the reason and meaning of facts—that we apply the laboratory method to all the subjects of study in our High School course. The first fact put before the pupil in Latin is the primary fact, the language itself, the living language as Caesar wrote it—not an array of rules and forms, secondary facts concerning the language. From the primary materials the student is taught, by the inductive method, to work out rules for himself. Taking in hand the thing itself, he proceeds to observe, formulate, generalize. Is not this the true laboratory method? The same may be said of the other languages.

In mathematics and in history similar methods are adopted. The thing must precede the definition and the operation induce the rule. Antecedent conditions must explain events, and specific instances lead up to general characterizations.

While the subjects in the physical sciences are necessarily elementary in their scope, still the same methods are followed as are followed in the higher schools, namely, the pupil is taught first, to observe with accuracy; secondly, to infer with precision; thirdly, to express the results of his own ob-

servations and inferences either by drawings or models, or in the clearest and most cogent language. The results obtained are highly gratifying. In the progress of the pupils from year to year one can see the gradual and steady increase in strength of mastery, in independence of thought and in the power of effective expression and clear representation.

The work in English Literature is placed, so far as possible, upon the basis of the pupil's individual thought. No author is studied merely with a view to the ascertaining of what his style is, what were the facts of his life or what particular school of thought he contributed to develop, but with the constant aim to enable the pupil to make the thought of the author become, so far as it is worthy of such adoption, his own possession; to assimilate the ideas and to absorb the excellences of style and of diction; these materials he is immediately to utilize by a healthy exercise and display of these very qualities in practical composition work.

From the very beginning the pupil is taught to take in hand the subject, simple at first and *gradatim* more complex, for the purpose of expressing in clear and forcible language, with due regard to arrangement and subordination, the ideas that he derives from observation. Constant and scrupulous care is exercised to prevent the tolerance of any habits of inaccuracy or carelessness in expression or in thought. In the use of English in every department of school work, whether the expression of the thought is oral or written, it is insisted that there shall be, first, vigor of thought, secondly, good sentence structure in oral speech, thirdly, correct pronunciation and clearness of articulation and, in written discourse, correct spelling and respectable penmanship.

In all these methods the one grand object in view is the training of men and women for the activities of life—the development of citizens who shall be prepared, when they enter upon the active world, to mingle with men and do well their part in promoting the advancement of the race. It is, therefore, properly a part of the system that pupils are trained to the utmost possible self-reliance in conduct as well as in thought, that the discipline, so far as practicable, is that of self-discipline in order to the establishment of a firm ground-work of moral character.

FOREIGN NOTES

BRITISH CONSERVATISM IN SECONDARY TEACHING

The Evening Post, (New York,) Oct. 7, 1895

A year ago we published some of the results of the work of the Oxford and Cambridge School Examination Board for the year 1894, calling attention to the evidence borne by them as to the conservatism of secondary education in Great Britain in respect to the teaching of the natural sciences. The tables for the present year show a still stronger preference for classical studies, for, though the number of candidates for certificates has increased by two hundred, those presenting the natural sciences are less in proportion than in the previous year. Two-thirds present Latin and more than a half

Greek, but only one in eleven a branch of natural science. The subjects having the highest number of examinees were elementary mathematics, Scripture knowledge, history, Latin, French, and Greek. Eighty-two boys' and fifty girls' schools were represented.

WOMEN AT THE GERMAN UNIVERSITIES

Evening Post, (*New York*,) *Oct. 14, 1895*

In the autumn of 1893 application was made for admission as matriculated students to the University of Göttingen by three young ladies, two of whom were American and one English. The former were graduates of an American college, and the latter had passed her examination in mathematics at Girton College in Cambridge, England. All three wished to study mathematics and physics. Serious objections from various sources were urged against the granting of this request; fortunately, however, it was favored by the professors directly concerned, who laid scientific papers written by the applicants before the Minister of Public Instruction, and finally succeeded in obtaining permission for them to attend lectures as "Hospitanten," or guest-wise, but they were not recognized as candidates for degrees. In the summer semester of 1894 there were twelve, in the winter semester of 1894–'95 fifteen, and in the summer semester of 1895, just closed, twenty ladies regularly attending the lectures; of these twenty, one also passed her examination and received the doctor's degree. This is the first instance of the kind in the annals of the University of Göttingen; for although Dorothea Schlözer passed a brilliant examination on September 17, 1787, in the seventeenth year of her age, and was declared by the faculty to be eminently worthy of a doctorate, she was not publicly "promoted" or graduated, and no diploma was conferred upon her. Women who wish to be admitted to an examination for a degree in the University of Göttingen must now have gone through a *triennium academicum*, or three years' course of study, either in a German university or in one of equal rank; the last semester must, in all cases, have been passed at a German university. Each one must also hand in a dissertation of scientific value, and sustain a satisfactory oral examination in her chief department, and in two secondary departments of study. The medical faculty still refuses to admit women either as students or hearers.

CHAUTAUQUA

Journal of Education, (*London*,) *October, 1895*

Chautauqua came of age this summer, and Professor Cook, of Yale University, has seized the occasion to give us a full account of its aims and influence. The place itself and the summer meetings are known, by name at least, to most English teachers, and they were recently described by Dr. Fitch in the *Nineteenth Century*. The other two agencies of which Chautauqua is the headquarters are not so familiar. These are the Literary and Scientific Circle, and the College of Liberal Arts (Correspondence Department). The former is a reading union which lays down a course for four

years. Since it was started in 1878 the total enrolment of members has nearly reached a quarter of a million. It has readers in every quarter of the globe, in Korea and Japan, in Mexico and the Hawaiian Islands. The prison circles add a considerable contingent. The members are mostly men and women of middle age. Diplomas are awarded to those who complete the course, but examinations are optional. The Correspondence College has been founded only two years, and has not developed in like proportions. The average enrolment of members has been two hundred and fifty a year. It is conducted mainly by university professors.

Professor Cook defines the Chautauqua idea as "an attempt to elevate, enrich, and inspire the individual life in its entirety." The definition strikes us as somewhat shadowy and too general. The success of the movement seems to us to be traceable to the realization of two very simple truths, the one embodied in the proverb, "No one is too old to learn," the other in the one word "coöperation." There are endless men and women who deplore their ignorance, and are sincerely anxious to improve themselves, but lack the mental energy to initiate for themselves a course of study. They crave for a pedagogue to lead them to school. Tell them what to read and they will read it, and, illogical as it may seem, the consciousness that thousands of other students like themselves are engaged in the same course of study is of itself a stimulus and incentive to learning. These are the principles on which Mr. John H. Vincent, the founder and maker of Chautauqua, has organized this world-famous institution.

SUPERANNUATION IN IRELAND

Journal of Education, (London,) October, 1895

The report of the Committee appointed by the Treasury to consider the question of the desirability of a fixed age for the compulsory retirement of professors serving under the Crown has been published. The members of the Committee were Lords Playfair and Welby and Sir Matthew White Ridley.

They give it as their opinion, after taking a large mass of evidence bearing on the point, that the limitations of age applied by the Order in Council to civil servants do not extend to presidents and professors of colleges. They consider the occupation of such persons is less likely to render them inefficient at the age of sixty-five than is the case with ordinary civil servants. They notice that the Queen's Colleges in Ireland are in a peculiar position, inasmuch as they derive their endowment mainly from the Consolidated Fund, and are consequently in close connexion with the executive Government. The professors are appointed by the Crown, and can be dismissed by the Crown at any time, if they become inefficient. The colleges, also, are governed by statutes proceeding from the Crown. The Committee recommend that some fixed rules should be framed for the superannuation of presidents and professors, by college statutes, and not by an Order in Council; and they suggest that professors becoming inefficient should be superannuated at sixty-five, and all professors at seventy; that presidents should retire

at seventy, except in special cases, in which they may be retained to seventy-five.

The Committee point out that the inefficiency of the services rendered is not the only evil involved, but that the exclusion of younger men from work they could more usefully do than aged professors is a loss no less to the students than to such younger men in academic life. They also suggest that where the professor has not been appointed till middle life seven years of service might be added in calculating his superannuation pension. What satisfaction would be felt within and without the walls of Trinity College, Dublin, if the recommendations of the Committee could be extended to that institution, and at once practically applied! Perhaps the Government may be induced to appoint a Commission to inquire into the present condition of Trinity College.

CONTINUATION SCHOOLS

The Educational Times, (London,) October, 1895

The fourteenth session of the evening continuation schools, which were established by the London School Board in 1882, opened on the third Monday of September. The number of pupils of both sexes receiving instruction and paying fees in these schools has reached the grand total of fifty thousand.

The subjects of instruction include commercial subjects such as book-keeping, arithmetic, shorthand, and French; general subjects such as English grammar, history, and literature, and English citizenship, geography, &c.; science subjects, embracing practical, plane, and solid geometry, machine construction and drawing, steam, building construction, magnetism and electricity, theoretical and practical chemistry, theoretical and applied mechanics, mathematics, hygiene, human physiology, and art —including freehand and model, and light and shade drawing, shading from the cast, shading from models, principles of ornament, &c. There are special classes in practical cookery, dress-cutting, and laundry-work for women and girls, whilst for men and boys there are classes in wood-work. To make the schools more useful and interesting, vocal music, physical exercises, (including drill and swimming), are taught, and the lantern is used in many schools to illustrate geography, history, &c. Students are prepared for the examinations of the Science and Art Department, Civil Service, Society of Arts, &c., and prizes and certificates are awarded. The fee is, as a rule, 3d. a week for any number of subjects, and in some districts a lower fee is charged.

SECONDARY EDUCATION IN ENGLAND

The Journal of Education, (London,) October, 1895

We had thought the present chaotic condition of secondary education, and the consequent friction, overlapping, and waste of power, were now thoroughly realized, and that legislation would follow pretty closely on the heels of the Royal Commissioners' Report. The *Times*, however, thinks differ-

ently, and asserts that the organization of secondary education is not likely to come within the range of practical politics while the large questions affecting elementary education are still unsettled. The same article goes on to give a somewhat elaborate analysis of the Schools Inquiry Commissioners' Report of 1868, "which is as applicable to educational legislation to-day as it was twenty-seven years ago." But surely the *Times* is unduly pessimistic or a little backward in knowledge. Some of the suggestions of this Commission have been already acted upon, and therefore fall out. Some have been shown by later developments to be unpractical. Things move slowly in England, but certainly secondary education has not stood still during the last twenty years. Witness the reorganization of country grammar schools, the large number of municipal intermediate and technical schools, the establishment of girls' high schools, and the general quickening of educational interest throughout the country.

The report of 1868 was an authoritative document, and has doubtless had full weight with the present Commission. But the problem to be solved to-day is not in all points similar to that which faced the Inquiry Commission. There are County Councils to be reckoned with, with their wider powers and large resources. There is the new factor of higher-grade Board schools competing with the lower secondary schools, endowed or private. And, above all, there is a change in the general attitude of the nation towards education. Thirty years ago education chiefly meant a certain literary culture, or at least an attempt at such. This, we still hold, is the highest form of education to be got from books. But we must face the fact that parents (England is a commercial country) are crying out for something more practical. Agriculture is in a parlous state. The scientists declare that farmers do not make proper use of new scientific knowledge. Hence agricultural schools are colleges for intending farmers. Foreign competition is affecting trade. Hence the cry for technical and technological instruction. It may not be noble, but it is a fact. The Report of the present Commission is a stage, and a considerable stage, in advance of the Recommendations of 1868.

THE INDIVIDUALITY OF PUPILS

Central-Organ für die Interessen des Realschulwesens, July 2, 1895

At the session of the Leipzic Pedagogical Society, October 20, 1894, Director Mittenzwey spoke on the fostering of individuality by the school. Beginning with the statement that the present endeavor was to do away with all differences and peculiarities, whereas not only nature in her forms displays the greatest diversity, but also in the human race, in the case of individuals, as well as in the case of whole races, differences likewise exist, the speaker characterized the German method, which maintains the right of individuality, just as also the Reformation, the greatest and most exalted achievement of the German people, had its strong roots in the endeavor to restore the individual mind to its native rights. Individualisation is not only a national, but also in general a human concern, because the very nature of every individual from birth is distinct in respect both of body and soul. If it is preëminently the mission of the family to do justice to the

individuality of the child, the school also, which represents the household and continues its work, is in duty bound to labor for the fulfilment of this all important task, inasmuch as it has for its object not only the instruction, but also the education of the child. For this reason schoolmasters of all periods have considered indispensable a profound study of human nature, combined with observation of the peculiarities of the pupil. Individualisation, however, has its limits, for the child must needs be early accustomed to regard itself a rising member of a well organized whole, and, therefore, to learn moderation in its demands. In order that the school may put in the proper relation the rights and duty of individuality, it should grant to the individual a definite measure of freedom, although this should involve no slight increase of labor on the part of the teaching force. Hindrances in the way of observing the peculiarities of the pupil are the overcrowding of classes, school buildings that are too large, and the system of special teachers. The study of child nature should not be satisfied with brief observations, but must be prosecuted as long as possible. Country teachers have in this matter an advantage over city teachers. To the so-called continuation system (*Durchführungssystem*) by which a teacher keeps a class during the entire period of its school life, there are manifold objections. Under the prevailing class system not only the marks of the pupils should be transmitted to the succeeding teacher, but he should also receive a description of the pupils' peculiarities,—that is, the record of the observations of preceding teachers. Such observations should extend to matters concerning the pupil's health, to all the phenomena of his mental life, to his relations with his parents teachers, and fellows; also to his home relations, etc. Ziller proposes eight classes of observations; Stoy has a different classification. The material of these records is to be derived from observation of the pupil's conduct in school, on his way to or from school, on his walks, upon the playground, etc. The picture can be complete only when the teacher maintains sympathetic relations with the home life; in many small cities, therefore, the schools have organized so-called parents' evenings. These character studies are of great value, not only for succeeding teachers, but also for the observer himself; they afford information for replying to the inquiries of parents, for the giving of testimonials, for depositions at court, and for advice with reference to the choice of a calling. The pedagogical insight and the psychological judgments of the observer are trained and sharpened; they promote active co-operation on the part of the whole teaching force. After the speaker had discussed the external form of the character sketches, he concluded with the words of Schiller:

> Keiner sei gleich dem Andern, doch gleich sei Jeder dem Höchsten!
> Wie das zu machen? Es sei Jeder vollendet in sich.

There followed this address, a long and lively discussion, in which reference was made to the difficulty of defining exactly the idea of individuality —the speaker had used it in the sense of the sum total of the natural peculiarities of the individual whereby he is distinguished from all other individuals—inasmuch as what is individual might easily be confused with what is personal. Emphasis was laid upon the fact that the common schools might presently have to make the general type specially prominent and train the children with regard to the ethical-religious ideal in a uniform way, and yet in instruction and training regard should be paid to the peculiarities of the children in order that, as the speaker desired, care for the individual should become a genuine care for the soul. The institution of parents' evenings in large cities could not be recommended, and there were also objections to having the character sketches of pupils pass from hand to hand; but it was, however, very desirable that the succeeding teacher should be informed on all important antecedents of the pupil.

(*Leipz. Tageblatt u. Anzeiger Nr. 550.*

PUBLICATIONS RECEIVED

PEDAGOGY

PAGE: Theory and Practice of Teaching, or the Motives and Methods of Good School-keeping. By David P. Page, A. M., Late Principal of the State Normal School, Albany, N. Y. With a Summary of the Life and Teachings of the Author by William F. Phelps, A. M. Size 4¾x6¾ in.; pp. 208. E. L. Kellogg & Co.

PHELPS: See Page.

Annual Report of the Board of Education and of the Superintendent of Public Instruction of New Jersey, with Accompanying Documents, for the School Year ending June 30th, 1894. Size 6x9 in.; pp. 879, lxxii. Trenton, N. J.: The John L. Murphy Publishing Co., Printers.

ENGLISH LANGUAGE AND LITERATURE

BALDWIN: Specimens of Prose Description. Compiled and Edited by Charles Sears Baldwin, Ph. D., Instructor in Rhetoric in Yale College. Size 4⅛x6½ in.; pp. xlviii, 149. Price 50 cents. Henry Holt & Co.

BREWSTER: Specimens of Narration. Chosen and Edited by William T. Brewster, A. M., Tutor in Rhetoric in Columbia College. Size 4⅛x6½ in.; pp. xxxvii, 209. Price 50 cents. Henry Holt & Co.

BUEHLER: Practical Exercises in English. By Huber Gray Buehler, Master in English in the Hotchkiss School. Arranged for Use with Adams Sherman Hill's "Foundations of Rhetoric." Size 5x7⅛ in.; pp. 152. Harper & Brothers.

CARPENTER: Longmans' English Classics. Daniel Defoe's Journal of the Plague Year. Edited with Notes and an Introduction by George Rice Carpenter Professor of Rhetoric and English Composition in Columbia College. Size 5x7¼ in.. pp. xxiv, 253. Longmans, Green & Co.

GUERBER: Myths of Northern Lands. Narrated with Special Reference to Literature and Art. By H. A. Guerber. Size 5x7½ in.; pp. 319. Price $1.50. American Book Co.

PERRY: Longmans' English Classics. Sir Walter Scott's Woodstock. Edited with Notes and an Introduction by Bliss Perry, A. M., Professor of Oratory and Æsthetic Criticism in the College of New Jersey. Size 5x7⅛ in.; pp. xxxi, 566. Longmans, Green & Co.

PHELPS: Students' Edition, The Sketch Book, by Washington Irving. The Author's Revised Edition, edited by William Lyon Phelps, A. M., Ph. D., Instructor in English Literature at Yale College. Complete in one volume. Size 5½x8 in.; pp. xxvi, 544. Price $1. G. P. Putnam's Sons.

RHYS: The Banbury Cross Series. Prepared for Children by Grace Rhys. Price $6.50. Macmillan & Co.

Jack the Giant Killer, and Beauty and the Beast. Illustrated by R. Anning Bell. Size 3⅛x3¾ in.; pp. 82.

Banbury Cross and Other Nursery Rhymes. Illustrated by Alice B. Woodward. Size 3⅛x5¼ in.; pp. 63.

Cinderella or The Little Glass Slipper, and Jack and the Bean-Stalk. Size 3¼x5¾ in.; pp. 62.

The History of Ali Baba and the Forty Thieves. Pictures by H. Granville Fell. Size 3½x5¾ in.; pp. 63.

Æsop's Fables. Illustrated by Charles Robinson. Size 3½x5¾ in.; pp. 42.

The Fairy Gifts and Tom Hickathrift. Size 3¼x5¾ in.; pp. 62.

Fireside Stories. Illustrated by Alice M. Mitchell. Size 3¼x5¾ in.: pp. 61.

Aladdin or the Wonderful Lamp. Illustrated by Sidney H. Heath. Size 3¼x5¾ in.; pp. 61.

Blue Beard and Puss in Boots. Illustrated by R. Heighway. Size 3½x5¾ in.; pp. 51.

The Sleeping Beauty and Dick Whittington and His Cat. Illustrated by R. Anning Bell. Size 3⅛x5¾ in.; pp. 60.

Little Red Riding Hood and the History of Tom Thumb. Illustrated by H. Isabel Adams. Size 3¼x5¾ in.; pp. 58.

The House that Jack Built, and Other Nursery Rhymes. Illustrated by Violet M. & Evelyn Holden. Size 3½x5¾ in.; pp. 62.

ROLFE: In Memoriam. By Alfred Lord Tennyson. Edited with Notes by William J. Rolfe, Litt. D. Size 5x7¼ in.; pp. 206. Houghton, Mifflin & Co.

SPENCER: See Way.

SPRAGUE: The Lady of the Lake. By Sir Walter Scott, Bart. Edited with Notes, by Homer B. Sprague, A. M. With Suggestions and Plans for Study, Topics for Essays, &c. Size 5x7¼ in.; pp. 224. Silver, Burdett & Co.

SPRAGUE: The Vicar of Wakefield. By Oliver Goldsmith. Edited, with Notes, by Homer B. Sprague, A. B., Ph. D. With Critical Comments, Suggestions and Plans for Study, Topics for Investigation, Essay Writing, Class Examinations, etc. Size 5x7¼ in.; pp. 201. Silver, Burdett & Co.

TAYLOR: The Werner Primer for Beginners in Reading. By F. Lilian Taylor. Size 5¾x7⅛ in.; pp. 112. The Werner Co

THOMAS: Select Minor Poems of John Milton. Hymn on the Nativity, L'Allegro, Il Penseroso, Comus, Lycidas. With Biography, Introduction, Notes, etc. Edited by James E. Thomas, B. A., Teacher of English in the Boy's English High School, Boston, Mass. Size 5x7¼ in.; pp. 123. Silver, Burdett & Co.

VERITY: The Pitt Press Shakespeare for Schools. Julius Cæsar. With Introduction, Notes, Glossary and Indexes. By A. Wilson Verity, M. A., Sometime Scholar of Trinity College Edited for the Syndics of the University Press. Size 4½x6¾ in.; pp. xxx, 207. Price 40 cents. Macmillan & Co.

WAY: The Song of Roland. A Summary for the Use of English Readers, with Verse Renderings of Typical Passages, by Arthur Way and Frederic Spencer. Size 5⅛x7⅛ in.; pp. 62. Price 40 cents. Macmillan & Co.

WRIGHT: Children's Stories in American Literature. 1660-1860. By Henrietta Christian Wright. Size 5x7½ in.; pp. vii, 249. Price $1.25. Charles Scribner's Sons.

GREEK LANGUAGE AND LITERATURE

BAYFIELD See Leaf.

HUDDILSTON: Essentials of New Testament Greek. By John H. Huddilston, A. B., Instructor in Greek in Northwestern University. Size 4x6¼ in.; pp. xxvi, 233. Price 75 cents. Macmillan & Co.

LEAF: The Iliad of Homer. Edited with General and Grammatical Introductions, Notes and Appendices. By William Leaf, Litt. D., Late Fellow of Trinity College, Cambridge, and M. A. Bayfield, M. A., Headmaster of Eastbourne College. In two volumes Vol. 1. (Books i-xii.) Size 4¾x6½ in; pp. lxiv. 567. Price $1 40. Macmillan & Co.

MORGAN: College Series of Greek Authors. Edited under the Supervision of John Williams White and Thomas Day Seymour. Eight Orations of Lysias. Edited with Introduction, Notes and Appendices. By Morris H. Morgan, Ph. D., Assistant Professor in Harvard University. Size 5¼x8 in.; pp. xlix. 223. Ginn & Co.

VAN CLEEF: Cornell University, Ithaca, N. Y. Cornell Studies in Classical Philology. Edited by Benjamin Ide Wheeler, Charles Edwin Bennett, George Prentice Bristol, and Alfred Emerson. No. V. Index Antiphonteus. Composuit Frank Louis Van Cleef, Ph. D. Size 5¾x8⅛ in.; pp. vi. 173. Published for the University by Ginn & Co.

FRENCH AND GERMAN LANGUAGES AND LITERATURES

GUERBER: Contes et Légendes. IIIème Partie. Par H. A. Guerber. Size 4¾x7¼ in.; pp. 192. Price 60 cents. American Book Co.

HARRIS: A German Reader for Beginners. With Notes and Vocabulary by Charles Harris, Professor of German in Adelbert College of Western Reserve University. Size 5x7⅛ in.; pp. vii. 356. Price $1.00. Henry Holt & Co.

KASE: Kleine Anfänge. Ein Buch für kleine Leute. Von Albertine Kase, Lehrerin der fremden Sprachen am Teacher's College, New York. Mit Illustrationen von Fedor Flinzer. Size 5¾x9¼ in.; pp. iv. 133. New York: William R. Jenkins.

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